FLIGHT

MAGAZINE

DECEMBER 1955

35 cents

TECHNOLOGY DEPT.

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CESSNA CH-1 UTILITY HELICOPTER

MERRY CRUISING!

Season's greetings
to the growing family
of helicopter
owners and users
. . . executives,
agricultural workers,
foresters, geologists,
police, newsmen,
and many others.

happy landings!

Congratulations to the helicopter manufacturers who have pioneered and developed this increasingly valuable tool for commercial and industrial uses. And to all of the aircraft industry — Magnolia Petroleum Company extends warmest wishes for a happy holiday season.

Best Pair to Get You There

Mobilgas AIRCRAFT

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SUPER-MOBILITY

For the Army!

In the rapidly changing concepts of modern military tactics, mobility still remains an important key. And there is no vehicle but the helicopter that fulfills the requirements of completely unlimited movement and utility.

The United States Army, early to recognize this unique capability of the helicopter, has welded rotary wing aircraft into an integral part of its plans and operations.

In less than ten years, the Army has developed a combination of top grade helicopter equipment, pilots, mechanics and training programs which are now providing a new type of SUPER-MOBILITY that is both efficient and economical.

Bell Aircraft Corporation, one of the Army's first rotary wing suppliers, is proud that Bell H-13 helicopters are making continued and significant contributions to the mobility of Army corps and the advancement of Army aviation.

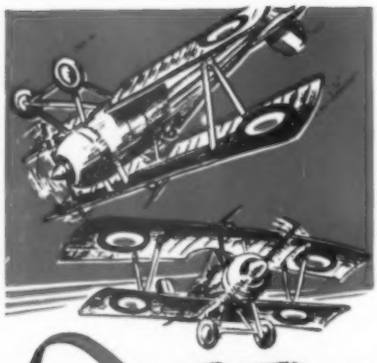
BELL *Aircraft* CORPORATION

"The most famous name in helicopters"

BUFFALO, N. Y. and FORT WORTH, TEX.

Phillips 66
PRESENTS

MILESTONES IN AVIATION



Squadron of Aces

In World War I, the famous "Hat in the Ring" 94th Pursuit Squadron, U. S. Air Service, chalked up many milestones in American military aviation.

Its members flew the first U. S. patrol over enemy lines in March of 1918. From April 14, 1918, through November 11, 1918, pilots of the 94th Pursuit Squadron scored 66½ victories over enemy aircraft. This figure does not include Major Raoul Lufbery's 17 victories, which were all scored while he was attached to the French Army. Personnel of the 94th included six "Aces," and commanding officer Captain "Eddie" Rickenbacker, with a total of 26 enemy planes to his credit, became America's "Ace of Aces."

Jim Ray

"ACES" of the
"HAT IN THE RING" 94th PURSUIT SQUADRON

Captain Edward V. Rickenbacker	26 victories
Captain Reed Chambers	7 victories
Captain Douglas Campbell	6 victories
1st Lieutenant Harvey W. Cook	7 victories
Captain Hamilton Coolidge (killed in action)	8 victories
Major Raoul Lufbery* (killed in action)	17 victories

*Major Lufbery, first commanding officer of the 94th, was the first pilot wearing the American uniform to shoot down an enemy plane (April 12, 1918), but never received official confirmation of this victory. He was killed in action on May 19, 1918, while in command of the 94th.

Phillips 66
AVIATION PRODUCTS

It's Performance that Counts!

Phillips Petroleum Company has performed outstandingly as one of the country's largest suppliers of aviation fuels for military and commercial use. Phillips now produces enormous quantities of 115/145 grade aviation gasoline, and also furnishes the most modern fuels for the latest designs in turbo-props and jets.

During World War II, Phillips was first to manufacture Di-isopropyl and HF Alkylate, two power-packed aviation fuel components of utmost importance to modern high-speed performance.

In aircraft fuels it's *performance* that counts. And Phillips *66* products are *outstanding* for performance!

AVIATION DIVISION
PHILLIPS PETROLEUM COMPANY
BARTLESVILLE, OKLAHOMA

AIR Report

Significant Trends and News

CIVILIAN CONTRACT FLIGHT TRAINING is being studied by the Navy and would be conducted by contract schools such as are now performing flight training for the U. S. Air Force. Navy last month began replacing obsolete, war-surplus North American SNJ (T-6) trainers with new Beechcraft T-34B Mentor tricycle-gear trainers. New Navy training is discussed in article on page 50, which also discloses use of boundary layer control for improved landing, take-off and slow-flying handling of the new Lockheed TV trainer, developed from the Lockheed TF-33.

FIRST SKETCHES OF NEW 4-PLACE PIPER COMANCHE were shown to Piper distributors at last month's annual sales meeting in Lock Haven, Pa. Of all-metal construction and with retractable tricycle landing gear, the Comanche may fly this winter but delivery is not scheduled until 1957. Price, power plant, performance and specifications have not been divulged but Piper calls the Comanche a medium-priced, high-performance airplane for the business flier. Presumably it will be in the $12,000, 160-mph. category. See page 17.

BOOMING PIPER AIRCRAFT SALES hit $20,500,000 in retail value in 1955 as compared to $9,600,000 last year and $4,300,000 for 1950. Even more spectacular is next year's quota for Piper distributors — $30,000,000 in retail billings.

NEW PRODUCTION AND HIGHER PERFORMANCE FOR BELLANCA CRUISEMASTER are promised by Northern Aircraft, Inc., a new corporation at Alexandria, Minnesota, which has purchased the manufacturing and sales rights, tools, dies, fixtures, plans and patents from the Bellanca Aircraft Corporation of New Castle, Delaware. Roy L. Strong, president, and Donald W. Pennertz, vice president, of the new Minnesota firm say their version of the Cruisemaster will be essentially the same as formerly except that cruising speed will be boosted to 200-mph. and range will be increased to 1,000 miles. The Cruisemaster is a low-wing, four-place monoplane of composite construction having a retractable landing gear. The new Minnesota firm will employ about 75 persons for production of the Cruisemaster in a new building which will be erected on land leased next to the municipal airport at Alexandria, Minnesota.

HIGHER PRICES FOR BUSINESS

(Continued on next page)

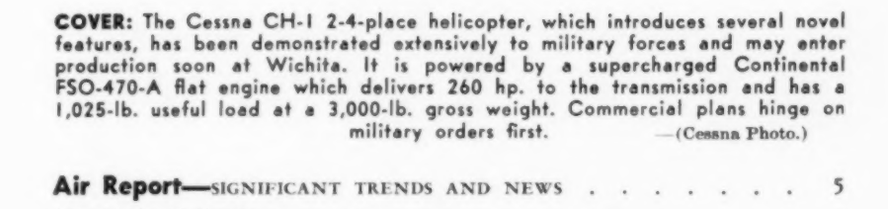
Standard Guide to Business Aircraft Coming

THE industry's First Annual Standard Guide to Business Aircraft will be published in April by the editors of FLIGHT MAGAZINE. A comprehensive year-round reference source on business and industrial flying equipment, aircraft utilization and operation, the annual will detail all 1956 current-production models of executive and utility aircraft and commercial helicopters.

In addition to design, performance, specification, prices, operating data and sales and service, the Standard Guide will feature accessories and extra equipment. Display and directory advertising will be limited to companies serving the important, progressive business and industrial aircraft market.

FLIGHT MAGAZINE

DECEMBER, 1955 VOL. 44, No. 6



COVER: The Cessna CH-1 2-4-place helicopter, which introduces several novel features, has been demonstrated extensively to military forces and may enter production soon at Wichita. It is powered by a supercharged Continental FSO-470-A flat engine which delivers 260 hp. to the transmission and has a 1,025-lb. useful load at a 3,000-lb. gross weight. Commercial plans hinge on military orders first. —(Cessna Photo.)

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GEORGE E. HADDAWAY, Editor-Publisher; TOM ASHLEY, Managing Editor; FRED N. STONES, JR., Business Manager; E. H. PICKERING, Consultant; P. O. Box 750 (2700 N. Haskell Ave.), Dallas, Texas—Telephone TEnison 6191.

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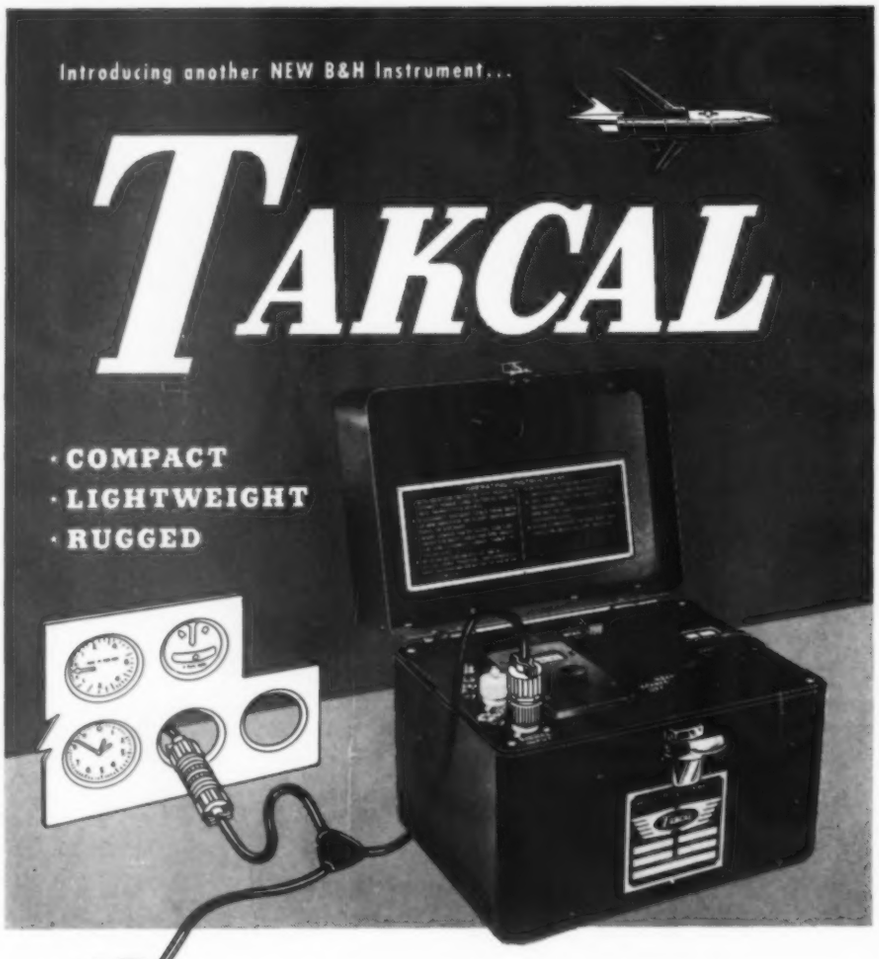
Introducing another NEW B&H Instrument...

TAKCAL



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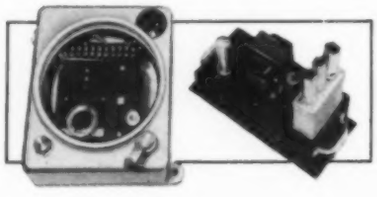
Reads Jet Engine Speed to Guaranteed Accuracy of 10 RPM in 10,000 RPM (±0.1%)

The new B&H TACKAL incorporates a refinement of the frequency meter principle. It operates in the low (0 to 1000 cps) range, reading the frequency of the tachometer generator on a scale calibrated in percent RPM corresponding to the engine's RPM. In addition the TAKCAL checks the tach system. The TAKCAL circuit and tachometer are parallel so that readings can be made simultaneously to determine the accuracy (or inaccuracy) of the aircraft's tach system. The TAKCAL operates during the engine run to properly set up engine controls for maximum economy and safety.

Originally developed as a component part of the J-Model JETCAL ANALYZER, the TAKCAL is now available as a separate unit for use with all earlier models of the JETCAL TESTER.

The TAKCAL operates accurately in all ambient temperatures from –40°F. to 140°F. Low in cost for an instrument of such extreme accuracy, it is adaptable to application in many other fields.



Explosion-proof TAKCAL for special applications. Measures 200 to 7500 RPM, direct reading, with ±0.1% accuracy.

For full information write or wire . . .

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PLANES have been posted by Piper Aircraft. Its 1956 models are up $550 for the Tri-Pacer, $575 for the Super Cub and $1,500 for the Apache.

AGITATION FOR AIRLINE HIRING OF NEGRO PILOTS, CREW MEMBERS AND STEWARDESSES has been started by a group calling itself "Urban League of Greater New York." It made demands last month on the presidents of eleven major airlines at a conference between them and President Eisenhower's committee on government contracts, headed by Vice President Richard M. Nixon. Objective is a non-discrimination clause in all contracts the airlines execute with the government. Failure of airlines to hire Negro flight personnel was described by the group as a "violation" of presidential executive orders affecting companies having government contracts.

COLLINS RADIO WILL MARKET CIVILIAN DISTANCE MEASURING EQUIPMENT (DME) utilizing the existing CAA ground system and National Aeronautical Corp. (Narco) of Ambler, Pa., is designing the equipment to Collins specifications and standards so that it will be "compatible functionally and quality-wise with the rest of the Collins aviation equipment." Sales and service, however, will be handled by Collins in the same manner as the rest of the Collins electronic equipment. The Collins-Narco deal apparently means that the major airlines are finally going to adopt DME, which business planes have been using in large numbers. Airline stand-off has been due to Tacan controversy but most authorities now agree that Tacan is at least 10 years away.

As of December 1, **ORDERS FOR THE FOUR-PLACE, HIGH-PERFORMANCE MOONEY MODEL 20 TOTAL 85 AIRPLANES.** Present

Airmen's Calendar

Dec. 17—19th Wright Brothers Lecture, U. S. Chamber of Commerce Auditorium, and Wright Day Dinner, Sheraton Park Hotel, Washington, D. C.

Jan. 9-11—14th Annual Miami-Havana Air Cruise, Sponsored by Florida Air Pilots Association; James G. Pace, Tour Director, 59 S. E. 8th St., Miami, Florida.

Jan. 9-13—Annual Society of Automotive Engineers Meeting, Sheraton-Cadillac and Statler Hotels, Detroit.

Jan. 23-25—Helicopter Association of America Meeting, with Hiller Helicopters as Host, San Francisco.

Jan. 23-26—24th Annual IAS Meeting, Astor Hotel, New York City.

April 22-26—29th Annual Business Meeting and Convention, American Association of Airport Executives, Hotel Carter, Cleveland; Exhibit Information from Claude F. King, Cleveland Hopkins Airport, Cleveland, Ohio.

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CONTINENTAL
MODEL 220
SHAFT TURBINE
Jet power
FOR THE AIR AGE
Continental, a great name in power, offers advanced development and modern manufacture to serve those requiring turbine power plants for helicopters, fixed wing aircraft, or other applications. If you manufacture equipment with a present or a prospective use for turbines —shaft power, air generators or jets— discuss your engine problems with C.A.E.
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SUBSIDIARY OF CONTINENTAL MOTORS CORPORATION

production is one a week with five a week planned by March. Norman Hoffman, Mooney sales manager, recently completed a nation-wide demonstration tour of the first factory production model.

Samuel Freeman, newly elected president of the National Aviation Trades Association, says **NATA WILL INSIST ON IMPROVED TRAFFIC CONTROL PROCEDURES** and a system flexible enough to guarantee the average VFR pilot won't get forced out of the air or relegated to outlying fields so that the utility of his plane is lowered. NATA will vehemently oppose any proposition which would require every flight on airways to be on a controlled basis.

USEFUL LOAD OF 1,373 LBS. FOR THE CAMAIR 480 TWIN is now authorized as a result of CAA approval of a new gross weight of 4,323 lbs. as compared to the old gross weight of 3,930 lbs. C. W. (Ted) Von Rosenberg, CAA Ft. Worth Region flight test chief, presented the approval to Hugh Gillham, Camair assistant chief engineer, last month. . . .

SOUTHERN FLIGHT SERVICE, Charlotte, is new Camair 480 distributor for North and South Carolina.

BRANIFF AIRWAYS HAS ORDERED 5 BOEING 707 JET AIRLINERS costing $30,000,000, including spares, for delivery beginning in October, 1959, specifying a Pratt & Whitney jet of advanced design over the 10,000-lb. J57. Braniff was recently authorized New York and Washington service from the Southwest. Schedules with the 600-mph. 707 include 1 hr. 38 mins. between Dallas and Chicago, 2 hrs. 15 mins. Dallas-Washington and 2 hrs. 36 mins. Dallas-New York.

NEW MESSERSCHMITT HA 200 LIGHT TWIN JET with two Turbomecas has a 440-mph. top speed, 7,000-lb. gross weight, length of 29 ft. and span of 30 ft. Built and flown in Spain, Prof. Willie Messerschmitt's new jet can be used as a trainer or as a business plane. The Messerschmitt company is resuming manufacture in West Germany and has been licensed to produce the French Fouga 170-R Magister V-tailed, 2-place twin-jet trainer using Turbomecas.

NEW GERMAN LIGHTPLANES for which production is being organized in West Germany include a 4-place, single-engine Focke-Wulf business plane designed by Prof. Blume with a 135-mph. cruising speed.

RUBBER-PAD RUNWAY SKID BRAKES, actuated by hydraulics, are being tested in England as a replacement for wheel brakes on large aircraft.

DELTA AIR LINES has ordered 5 new Convair Metropolitan airliners

DECCA...

draws the exact course as the Helicopter flies!

DECCA is an extremely accurate *visual* navigator system. Every movement of the craft is instantly traced on the Flight Log. This is an actual terrain map on which the pen traces your exact course. You see exactly where you *are* and you fly—*in any weather*—a safe, positive course.

Decca is a *low frequency* navigation system operating from a chain of master and slave stations located in a star pattern and covering an area of some 200,000 square miles. Unlike high frequency line-of-sight transmission, Decca provides low-flying helicopters with position-fixing accuracy *down to ground level—even behind hills.*

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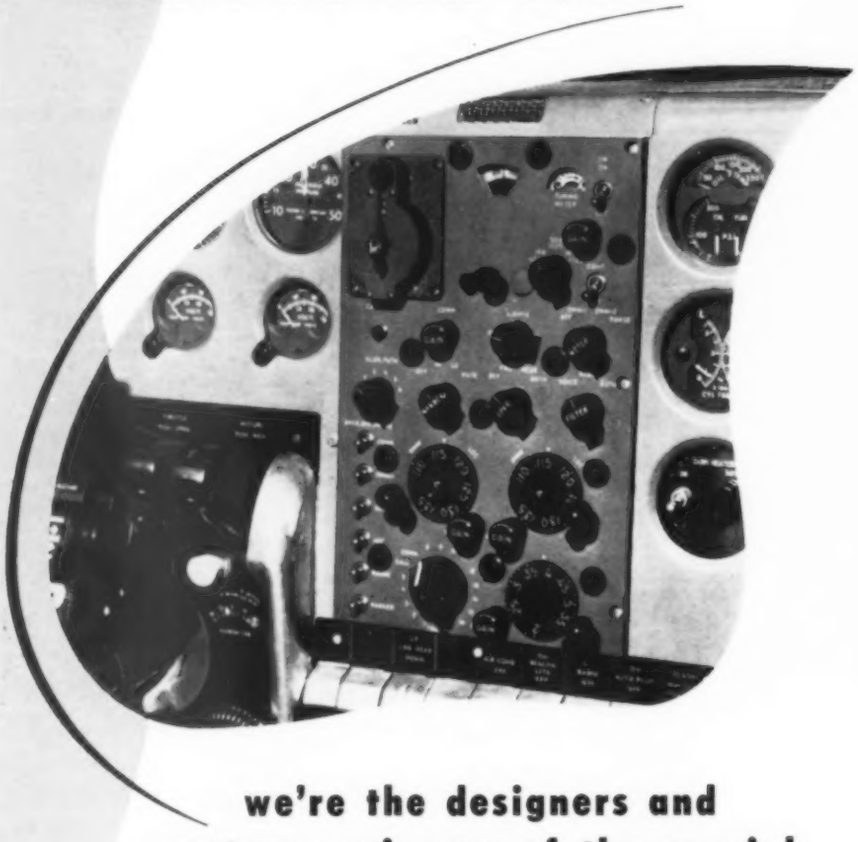
UNLESS WE TOLD YOU...



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Complete Beechcraft Bonanza ACCESSORIES are available at Aircraftsmen Inc. . . . map and thermos cases, curtains, visors, breather oil separators, aileron trim controls, and ten-gallon auxiliary fuel tanks . . . installed by FACTORY-TRAINED, experienced technicians.

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costing $3,475,000. . . . **CENTRAL AIRLINES** has been authorized to serve St. Louis from Ft. Smith.

CENTRAL NORTHERN AIRWAYS at Winnipeg, one of Canada's foremost bush and charter operations, has bought three Bristol freighters and a C-47 from Trans-Canada Air Lines for $825,000.

A NEW 500-MPH., LONG-RANGE TURBOPROP AIRLINER is being readied for production on both sides of the Atlantic as a joint effort between the Bristol Aeroplane Company of England and General Dynamics Corp. of New York (Convair, Canadair and other interests). Meeting U. S., British and Canadian specifications, it would compete against intercontinental jet airliners. It is designed around Bristol BE25 turboprop engines and would be a successor to the long-range Britannia.

FLIGHT TESTS OF THE NEW REPUBLIC F-105A FIGHTER-BOMBER are being conducted at supersonic speeds. The needle-nosed, swept-wing Air Force design uses the J57 jet of 10,000 lbs. thrust.

TRANS-ATLANTIC DELIVERY OF A CESSNA 310 TWIN has been made to Bill Lear, of radio-autopilot-Learstar fame, by his son, Bill, Jr. The elder Lear now resides in Switzerland where he is doing research.

BEECH HAS RECEIVED A MILLION-DOLLAR ORDER FOR T-34 MENTOR AND MODEL 18 TRAINERS from the Chilean Air Force, which received its first T-34's last year.

FREE COPIES OF A BOOKLET, "YOU AND INSTRUMENTS," are being distributed by Esso Standard Oil's aviation department through its dealers to licensed pilots as a service to aviation progress. The booklet, authored by Col. Joe Duckworth, former commander of the USAF Instrument Instructors School at Bryan, Texas, discusses the rudiments of instrument flying and familiarizes the reader with the 180-degree turn philosophy by which unqualified instrument pilots can avoid weather flying hazards. R. C. Oertel is manager of aviation sales for Esso Standard Oil's marketing.

FAIRCHILD HAS DEVELOPED A RADICAL SINGLE-ENGINE, TWIN-PROPELLER SHORT-FIELD WORKPLANE using the vectored slipstream principle featuring large movable wing flaps to deflect the propeller slipstream downward for nearly vertical take-off and landing in a horizontal attitude. Called the M-232 Dragonfly, it is a private venture by Fairchild Aircraft and appears to have a single piston engine of undivulged horsepower which drives a large propeller on each wing. It will fly early in 1956 as a single seater but with provisions for carrying a

(Continued on page 14)

Breaking the Sound Barrier

TEMCO helps build the supersonic **F-100** Super Sabre

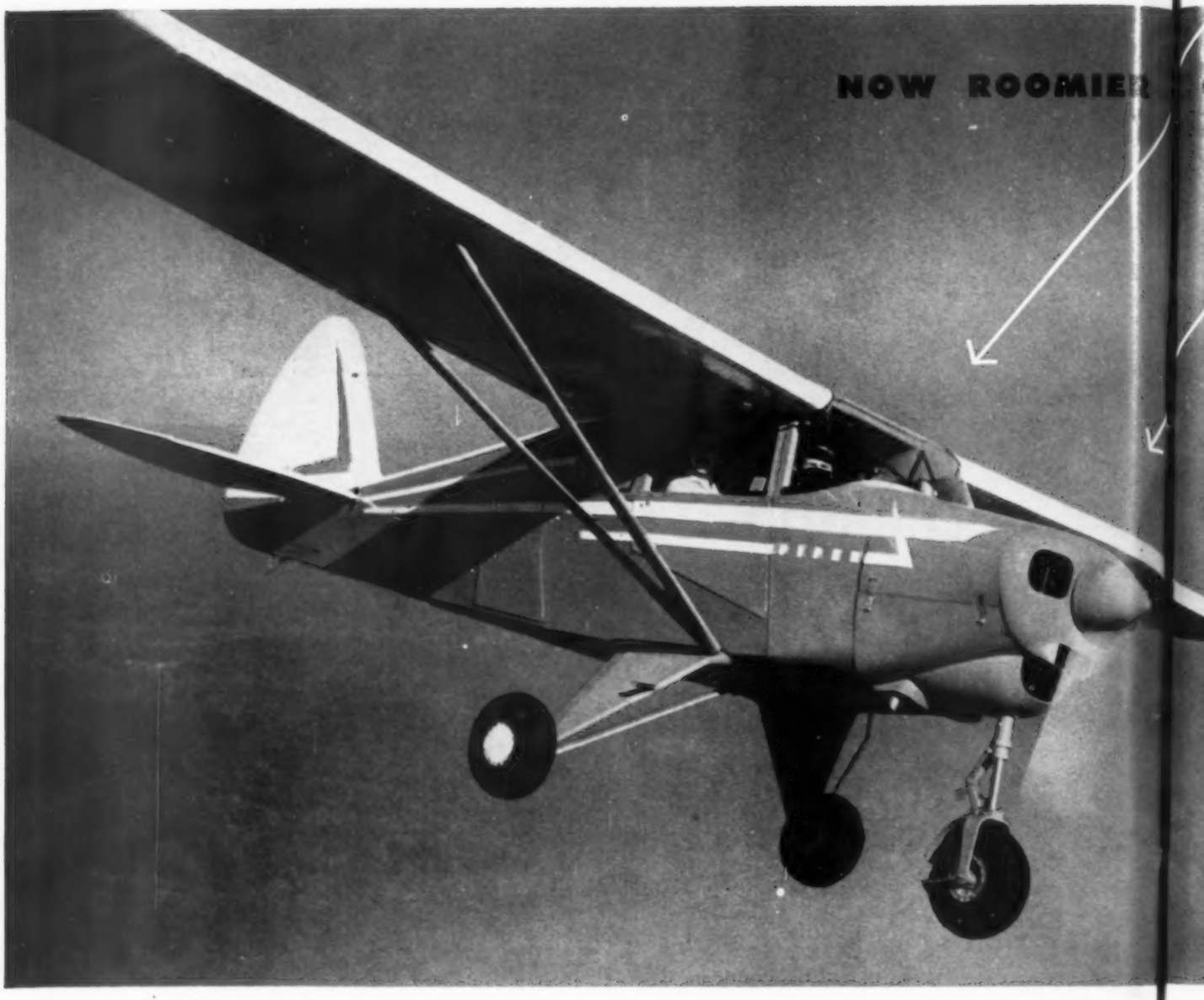
Recently, North American awarded TEMCO three important jobs on the Air Force F-100 Super Sabre.

This fighter was the first operational aircraft to break the sound barrier in level flight. Vital F-100 components — wing-tip panels, ailerons, flaps, pylons — are being fabricated at TEMCO.

These jobs are typical of TEMCO's work on a growing number of first-line military aircraft. And, on its 10th Anniversary, TEMCO pledges a continuing effort to preserve the peace by keeping America strong — **the industry's Number One Job.**

ENGINEERS . . . if you are interested in a position with a growing weapons system organization, write full particulars to E. J. Horton, Jr., Engineering Personnel, TEMCO Aircraft Corporation, P. O. Box 6191, Dallas 2, Texas.

TEMCO
AIRCRAFT CORPORATION
DALLAS, TEXAS



COMFORT AND ELEGANCE of the quiet, sound-proofed cabin make Tri-Pacer travel a pleasure. For added room, rudder pedals and panel have been moved forward and front seats can be adjusted fore and aft separately to suit individual requirements. Deeply upholstered seats, double heaters fore and aft, and five separate fresh air ventilators assure passenger comfort. Separate front and rear doors are an exclusive Tri-Pacer feature.

QUIETER FINER IN EVERY WAY

THE NEW Tri-Pacer 150

packed with performance

Safety, performance, economy and flying ease—all are engineered into the new, more spacious 1956 Tri-Pacer. With 150 horsepower this four-place business airplane has outstanding small field performance, cruises over 130 mph at optimum altitude.

And its flying ease is unmatched. Its husky tricycle landing gear, proven over five years of daily use by thousands of Tri-Pacers, takes the skill out of landings, even with cross-wind conditions. Its simplified controls, with interconnected rudder and ailerons, eliminate the need for coordination.

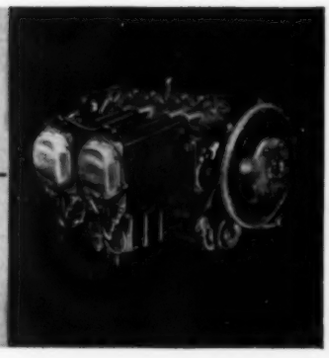
Over-all is the striking new beauty of the Tri-Pacer with its smart two-tone styling over the tough, resilient, non-flammable, exclusive Piper Duraclad finish.

You get all these features for far less than any other four-place airplane. Little wonder the Tri-Pacer is by far the most popular low-cost business airplane on the market today.

See and fly the smart new 1956 Tri-Pacer at your Piper dealer's today or write for new full-color brochure.

FLYING EASE. Single hand brake of the Tri-Pacer assures short, easy stops. Just one of many reasons why the Tri-Pacer 150 combines the most features to simplify flying.

LOADS OF ROOM. All this baggage fits easily into the Tri-Pacer's baggage compartment. For cargo, the rear seat is quickly removable providing 42 cubic feet of unobstructed space.

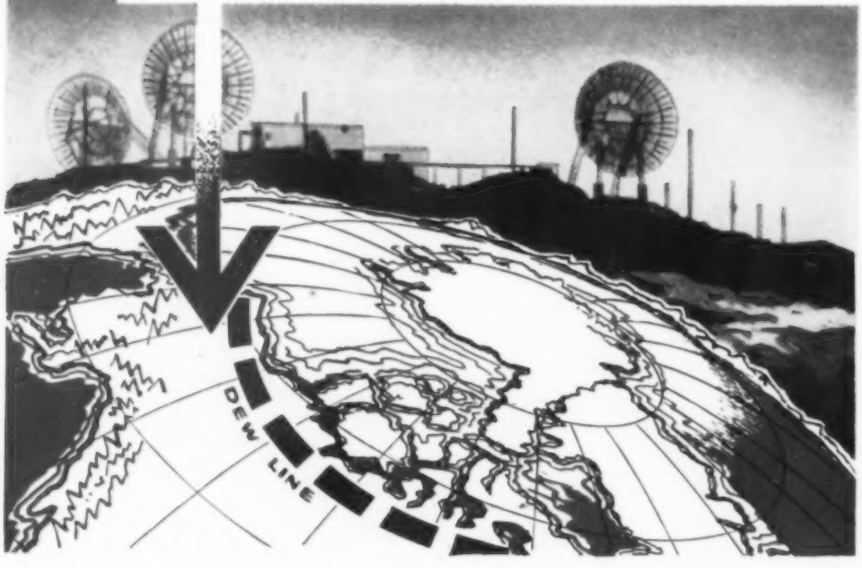


150 HORSEPOWER. Heart of the new Tri-Pacer's unmatched dependability is its power plant—the smooth 150 hp 0-320 Lycoming engine. Simple four-cylinder design means longer periods between overhauls and lower maintenance costs. And you average nearly 15 miles per gallon of gas.

PIPER AIRCRAFT CORPORATION
LOCK HAVEN, 4, PENNSYLVANIA

Piasecki H-21 Work Horse helicopters are playing an indispensable part in building and servicing early-warning Arctic radar and communication stations.

Daily, H-21's are ferrying construction personnel and tons of equipment to remote mountain top sites. This **peak service** is providing a vital third dimension in transportation for America's first line of defense.



piasecki helicopter corporation
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ENGINEERS NEEDED: *Send resume to Employment Representative*

Who, Me, Fly?

THE Cessna Aircraft Company, whose 1955 commercial airplane sales will exceed 1955 military business, plans to launch an effective national campaign based on a psychological impact on people who are reluctant or afraid to learn to fly even though they might like to own and use airplanes.

Citing the fact that many airplane salesmen in making "cold" calls on businessmen are almost invariably met with the question, "Who, me, fly?" Cessna's sales promotion department intends to capitalize on the question by using it on huge red and white celluloid buttons for general distribution, backed up by a national advertising campaign based on the theme of the surprised businessman asking, "Who, me?"

AIR REPORT

(Continued from page 10)

belly pod for cargo or for 4 to 6 passengers. No details have been released but it presumably would gross more than 6,000 lbs. and would land or take-off within a distance of less than 500 ft. With the vectored slipstream from the propellers, power would be used for short-field landing.

AMERICAN HELICOPTER DIVISION of Fairchild at Costa Mesa, California, is not currently active in the helicopter field, its contract for a small jet copter having ended with flight tests. Its activity is centered on metal sandwich material developments.

TIP JET BURNERS on British Fairey Gyrodyne are supplied with compressed air from the craft's piston engine. Fuel is mixed with this air and ignited in the pressure jets to power to rotor. Pusher propellers on stub wings are driven by the piston engine for forward flight. This is an experimental craft.
—(British Information Service Photo.)

The Most Trusted Name in Ignition

First choice for light plane ignition

Over the years, Bendix ignition has been the choice of leading engine manufacturers and plane builders in the light plane field.

For example, Bendix magnetos are widely used by such outstanding engine builders as Continental, Aircooled and Lycoming, and are found on such popular types of planes as Beech Bonanza and Twin-Bonanza, Cessna 170, 180, and 310, Aero-Commander, Grumman Widgeon, Piper 135 Pacer, Tri-Pacer, and Apache, Riley Twin-Navion, and Ryan Super-Navion.

There is good reason for this widespread acceptance in the light plane field. Long experience in all phases of aviation has enabled Bendix to design magnetos incorporating every desirable feature of performance at prices compatible with light plane manufacturing requirements.

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S-50 SERIES

S-20 SERIES

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Bendix

Just among ourselves

EDITORIALS

Your Community Can Have a Civil Defense Copter

THE announcement by Federal Civil Defense Administrator Val Peterson (in FLIGHT MAGAZINE's exclusive article by him on page 28 of this edition) that local and state governments can now purchase helicopters with the Federal government sharing half of the original cost is the most important commercial helicopter news of the year.

It is too early to predict just how many counties, cities and states will avail themselves of this significant opportunity. But it is not too early to assess the effect the FCDA offer might have on more widespread civilian acceptance and utilization of rotary-wing aircraft, which up to now have been understandingly dominated by military requirements.

The phenomenal growth of commercial helicopter traffic in such metropolitan areas as Los Angeles, Chicago and New York coupled with the constantly increasing number of commercial enterprises discovering and purchasing the versatile helicopter for all sorts of special jobs certainly attest to the fact that the whirlybird is at last coming into its own as a machine for universal applications no longer wholly dependent upon the uncertainties of military attitudes and appropriations.

Even if only 25 states or municipalities take advantage of the FCDA offer to pay one-half the cost of helicopters the impact on broader helicopter utilization would be terrific. In spite of the fact that the program is based on civil defense considerations, it is plainly evident that local and state government agencies will discover what such organizations as the New York police department has discovered — the machines usually pay for themselves almost every month of the year. The dramatic rescue work done by helicopters during the hurricane floods in the east earlier this year brought home the fact to millions of our population that rotary-wing aircraft are as basic to public protection as police patrol cars, fire wagons or snow plows.

What happened during the floods in Connecticut and Pennsylvania this year happens every year on a smaller but no less tragic scale elsewhere over the broad domain of our country. While the FCDA plan is primarily a disaster matter in case of enemy attack there will be few restrictions by the FCDA as regards limitation of public use. So the more helicopters we can get into operation by municipalities and states, with trained personnel who will become experienced in flying, maintaining and working with the machines, the more insurance we have against all types of disasters but particularly in case of enemy attack, when military helicopters simply would not be available to the civilian population as they are now in peacetime catastrophes.

We are confident that the FCDA program for sharing half the cost of helicopters will receive widespread acceptance by our more enlightened and responsible public officials who are keenly aware of the overwhelming chaos staring us in the face in the event of enemy attack and who will agree with Mr. Peterson that the helicopter is one of the principal missing links in our plans to cope with such chaos if it comes. Unless our communities and states stop playing ostrich about the matter of civil defense and join hands with the Civil Defense Administration in this and other vital projects and planning, our states and communities are simply inviting disaster. Here's a deal they can not conscientiously turn down. The cost is negligible in comparison with the benefits offered.

The CAB Chairman

WHEN the Hon. Ross Rizley was appointed to the Civil Aeronautics Board as member and chairman early this year, these columns expressed the belief that the White House had made a good appointment. Rizley's record of service on the Board bears out the confidence expressed at that time. An able lawyer, a former member of Congress without any previous aviation connections and a typical citizen of a middle-western small town, Rizley has brought some fresh new thinking and constructive new approaches to many of the problems surrounding the Civil Aeronautics Board as well as the problems of the air transportation business itself.

Last month in Enid, Oklahoma, Mr. Rizley made his first public speech since he assumed the Board chairmanship. In a review of the Civil Aeronautics Act and the basic functions of the CAB he pointed out that the central and overriding principle established by the Act is public convenience and necessity — words that have "no hidden and mystic significance". Mr. Rizley believes that this basic objective of public convenience and necessity, that is, whether the public needs more service or more competitive service between any two points — is submerged in the question of who shall render a service which everyone agrees is necessary. "Proceedings", he complains, "drag on before examiners for weeks on end on the issue of choice of carriers". The courts through the Ashbacker doctrine have added further difficulties and confusion.

Another Rizley observation centers around the matter of pressures — extrajudicial efforts to promote or defeat a certain decision. Board members are constantly harrassed plus the fact that extraneous issues and political considerations distort the evidence of record. Congressmen, he thinks, should inquire as to the progress their constituents' case is making, assure themselves that the case does not mire down in red tape, but not jeopardize with pressure the integrity of the whole independent agency system.

He suggests that the Congress should consider whether the Civil Aeronautics Act cannot be revised to cure some of the difficulties. The doctrine of the Ashbacker case can be given a more restricted application. Many routine

(Continued on page 18)

Piper's New Comanche For High Performance

FIRST sketches of Piper Aircraft Corporation's new high-performance, all-metal four-place Comanche business plane are shown on this page. Prototype is now being built, with production tooling going in simultaneously. First flight is expected next spring with first deliveries early in 1957. No details have been divulged but the Comanche, with retracting tricycle gear, will be in medium-price bracket and presumably top 160 mph. in speed. Piper says it will supplement its line of planes, not replace any model.

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JUST AMONG OURSELVES

(Continued from page 16)

issues in new route cases could be handled in *ex parte* proceedings without destroying the basic foundation of a hearing on public convenience and necessity. Also rules of evidence can be tightened.

Additionally, the Board and its staff should get out more and visit with the industry so that they can become more familiar with the actual operations of the industry, even if it requires free transportation from the airline operators. He suggests the creation of an all-industry CAB advisory group composed of outstanding citizens throughout the industry, including representatives of labor, the users, plane owners, pilots and representatives of the trade press as well as airline management and public officials.

About the most important influence Chairman Rizley has had on Board operations is his unremitting attack on the log jam of cases before the Board. We always have believed that the Board has been more guilty than the industry in creating the almost hopeless morass everyone has to wade through to file, hear and establish and wait out even the simplest sort of case. It is encouraging to find Board members alert to the situation. Chances are the Civil Aeronautics Board can do more in cleaning up its own house than Congress. But if the Civil Aeronautics Act needs a major overhaul it's very clear that the present Congress will act. We won't soon forget that the Congress last May ordered the permanent certification of local service carriers over the protest of a CAB majority and the administration itself. We concur with Mr. Rizley that there's lots of room for improvement both by the Board's own initiative and at the legislative level.

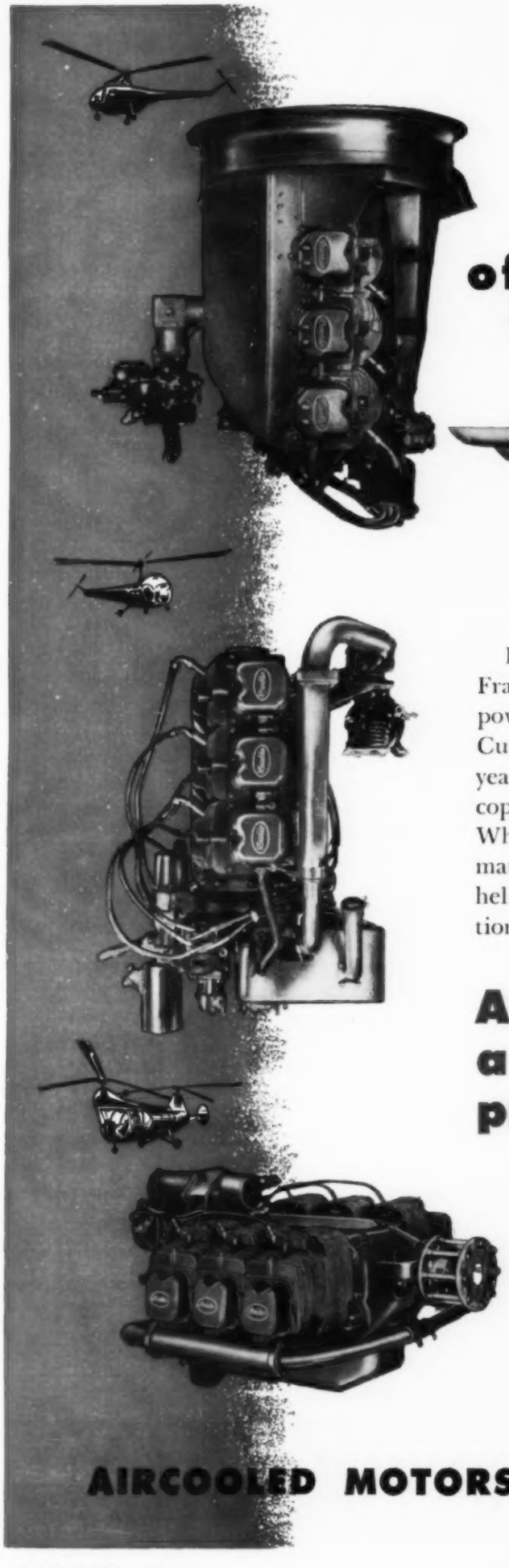
We also concur with President Eisenhower's re-appointment of Rizley as chairman and earnestly hope he will serve the full term, despite rumors to the contrary that he hopes for a Federal judgeship.

Murder on the Airways

WANTED: A Federal law that will guarantee speedy justice and the death penalty to anyone attempting sabotage of any and all interstate passenger transportation.

Public indignation over the heinous murder of 44 passengers and crewmen of the United Air Lines DC-6 near Denver last month cries out for passage of such a law the moment Congress convenes. This was the worst mass murder in U. S. history. The absolute-

(Continued on page 77)



75%

of all the helicopters flying today have

Franklin POWER

1955 is no exception to the rule that far more Franklin aircraft engines are chosen for helicopter power than any other kind in their power range. Current industry production figures show that this year, as in every year since 1939, 4 out of 5 helicopters under 400 h.p. will have power by Franklin. Why this preference? Because no other engine can match the Franklin engine record for reliability in helicopter installations, combined with low operational and maintenance cost.

Aircooled Motors is also a major subcontractor of precision machining

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HERE ARE FACTS WHY

DME IS A SAFE INVESTMENT

There has been so much smoke and confusion about future navigation systems that the airspace is apt to be filled with ideas instead of navigation signals.

The situation has understandably bewildered aircraft owners and given them cause to wait and see—even though they realize that a navigation system which gives them both distance (rho) and bearing (theta) would greatly simplify their cross-country navigation and IFR operations.

These facts are now clear and cannot be disputed:

1. The VOR/DME system is fully developed providing highly dependable and extensive service. Congress has appropriated funds for continuation of this system. There are 231 DME's in operation now and 175 more on site ready to be turned on when additional funds become available.

2. CAA, in its 5 year navigation program proposal just made public, calls for 383 more VOR's and 648 additional DME's.

3. The Air Coordinating Committee, whose recommendations generally set National Air Policy, has assured DME operation for years to come. ANDB's decision earlier this year was not to *adopt* Tacan, merely to investigate its possible use in the Common System.

4. Tacan is still in a very experimental stage as a common system element. In its present form it is strictly a tactical navigation equipment. Conservative estimates say that four years would be required to re-engineer ground equipment for satisfactory civil airway use. No satisfactory design for airline or small aircraft Tacan has been demonstrated. Tacan does not provide voice communication or ILS approaches and these functions would require separate equipment if Tacan were adopted in its present form.

5. Implementation of such a system on the airways to the same level of operation as VOR/DME today would require eight to ten years. This has been confirmed by CAA, ANDB and IATA.

6. There is no argument in any quarter as to the reliability, accuracy, or dependability of present-day DME. It is recognized by all as being equally accurate as any other distance measuring system. It has been completely "de-bugged" and backed by a nation-wide service.

7. New, authorized DME approach procedures are already being published in the Airman's Guide and are being incorporated in the Jeppesen Manual as fast as released. These DME approaches permit lower minimums in many cases where terrain clearance has been a problem, reduce to a minimum let-down procedures, greatly expedite instrument operations. Australia has made DME mandatory for airline operations and pilots report DME far more accurate than older systems of using cross-bearings and even fan markers for position indication.

8. The conclusion which can be drawn by any clear-thinking aircraft user is that:

- **No other system can possibly supersede DME for a decade.**
- **VOR/DME provides *today* and in the years to come a highly superior navigation system with continuous position indication without estimate, calculation or guess-work.**
- **Highly reliable, light-weight airborne DME is available today.**
- **Anyone installing DME in his aircraft can be assured beyond any question of doubt of getting a full span of usefulness out of his DME with no danger of rapid obsolescence.**

If you would like more information on Narco Model UDI-1A DME see your nearest Narco distributor, factory-approved service center or write to National Aeronautical Corp., Ambler, Pa.

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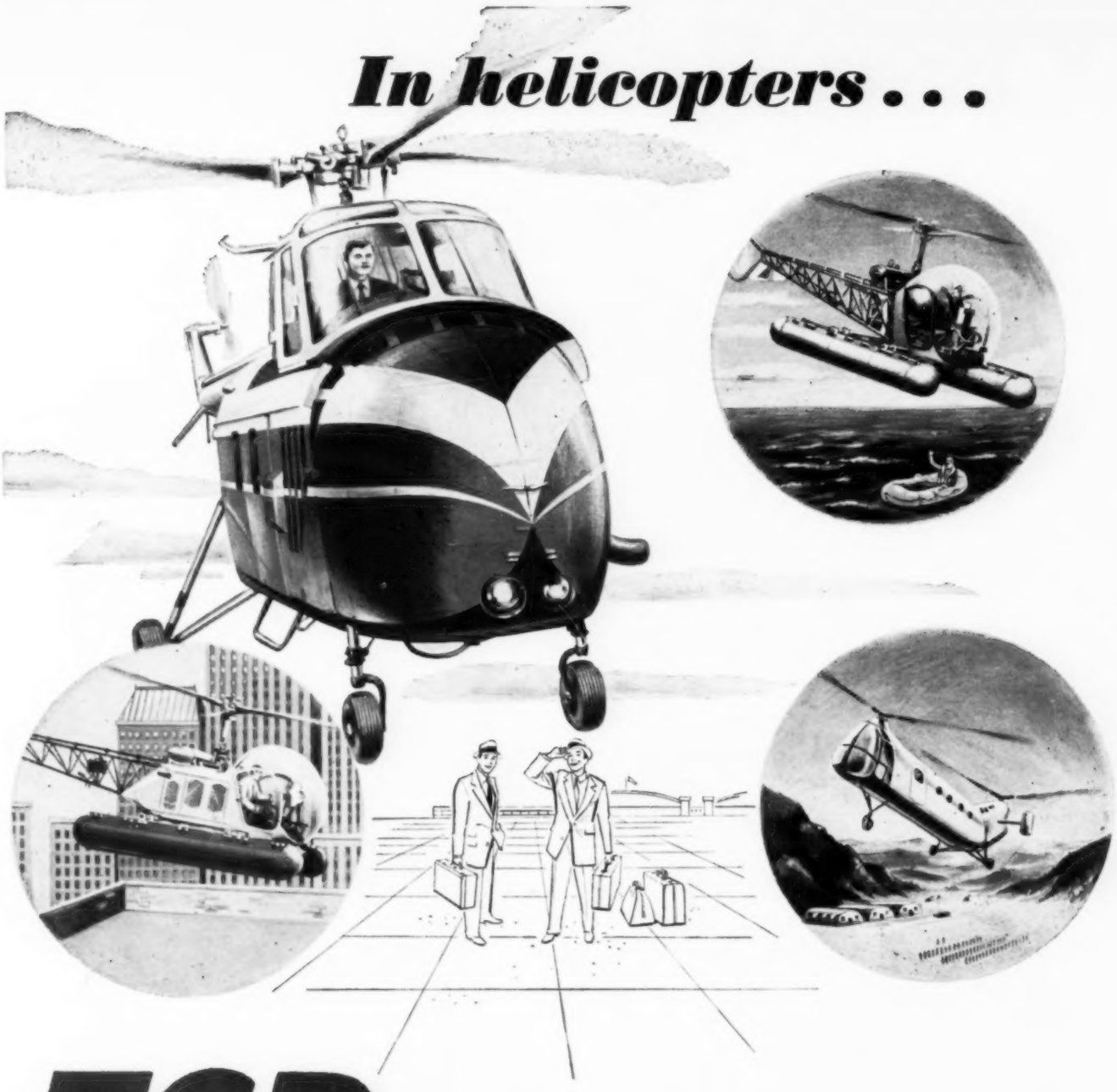
In helicopters . . .



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TCP additive controls spark plug fouling caused by lead and carbon deposits. By using TCP, operators get longer spark plug life, more power . . . greater dependability.

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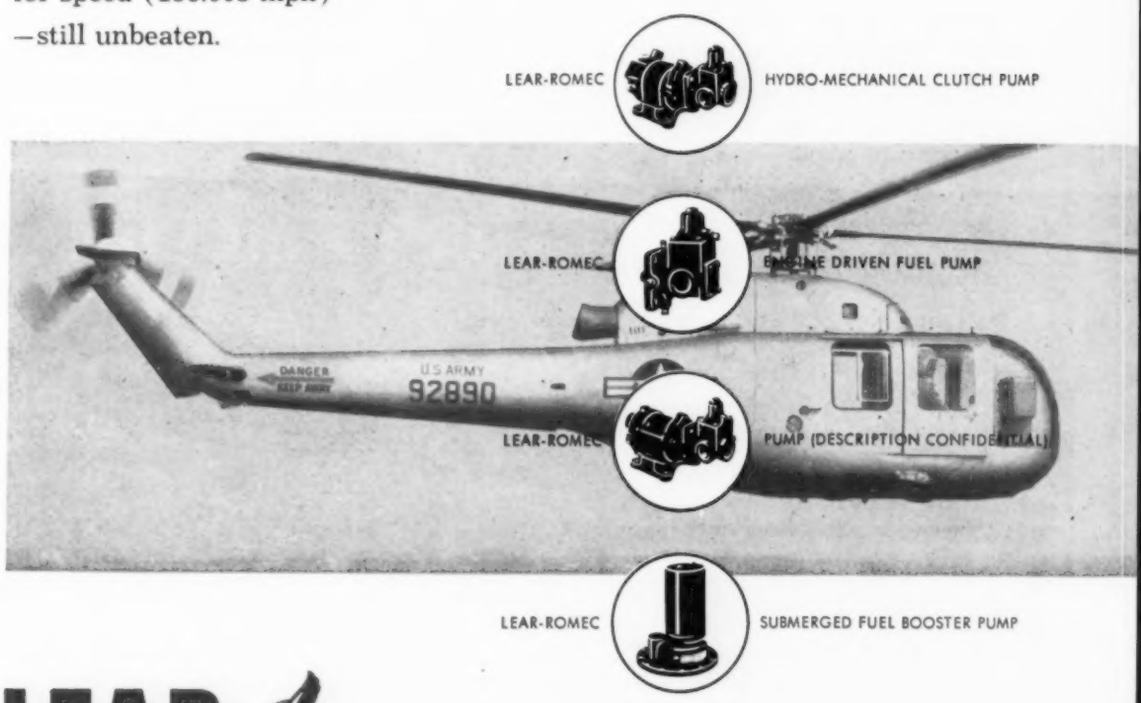
Yes, *four* Lear-Romec pumps
helped the Sikorsky XH-39 set
world's helicopter record
for speed (156.005 mph)
—still unbeaten.



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For example: we supply them with complete stocks of time-proved Goodyear Aviation Products—including the famed tires, tubes, wheels and brakes that have long been first choice as *original equipment* on such popular private and corporate aircraft as Cessna, Beech and Aero Commander.

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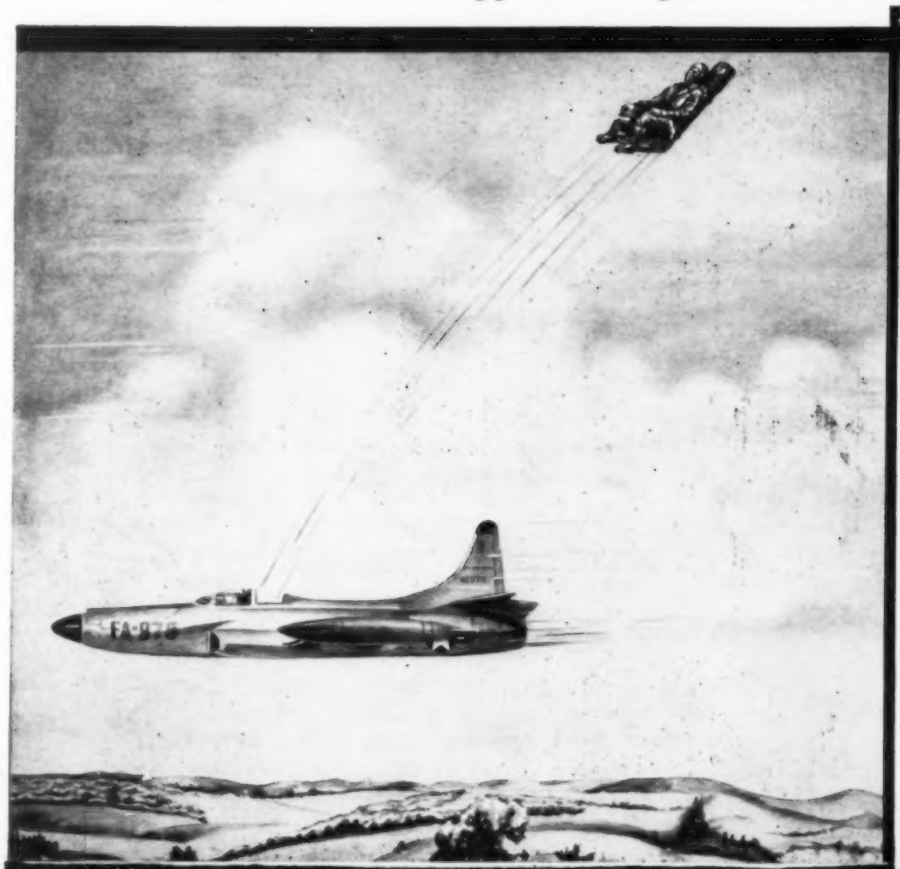
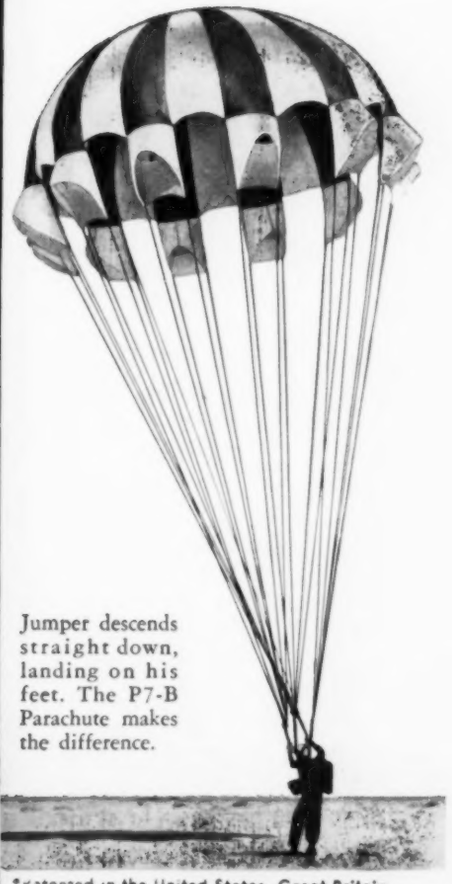
In aviation, the miracles of yesterday are routine today. Pioneer Ribbon Parachutes used for air brakes on jet planes as well as many other applications; the New P7-B* Guide Surface Personnel Parachutes are but two of the many types made by Pioneer which have established Pioneer's reputation as the world's Leading parachute designers and manufacturers!





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For the first time, an aircraft spark plug for lower-power-output engines is completely sealed against moisture, oil, and dirt.

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Now, short-reach plugs have all the advantages of AC's famous "high-altitude" all-weather spark plugs . . . advantages that have proved themselves in millions of hours of flight in America's military planes and leading airlines.

Completely sealed around the top of the insulator, these new short-reach spark plugs keep out moisture and prevent flash-over even under seaplane operating conditions. And, in addition, you can expect *twice the life of ordinary spark plugs!* Have a new set installed now!

Models HSR-86 and HSR-83-P are ¾—20 barrel size. For standard ⅝—24 harnesses, AC also produces the S-86-R and SR-83-P.

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MATS Beats Flight Program Schedule

with Allison Turbo-Prop Engines and Aeroproducts Propellers

To MATS' 1700th Test Squadron – Congratulations for a good job well done.

This month, the final hour will be flown on a program which has as its target 3000 flight hours by January 30, 1956 on two Convair YC-131C aircraft powered with Allison Turbo-Prop engines and Aeroproducts Propellers. The program will be completed more than 30 days ahead of schedule – thanks to the skill and enthusiasm of the pilots and crews who were given the job to do.

The aircraft were delivered to MATS at Kelly AFB, San Antonio, Texas, in January, 1955. The 1700th Test Squadron had just been activated and was composed of men who not only were outstanding in their abilities but who demonstrated a genuine enthusiasm for Turbo-Prop transports in military aviation.

Colonel Claude Smith, Commander 1700th Air Transport Group, and his staff immediately initiated a familiarization program for all personnel and the entire squadron set out to obtain maximum time on the two aircraft. The object was to prove the place of turbo-prop-powered transport in military aviation.

Hours on the aircraft mounted rapidly. Sometimes the planes shuttled between Kelly AFB and Travis AFB, or to Andrews, or to the Allison plants in Indianapolis. And many days went by with pilots making operational flights over Texas. Three and four flights a day with five hours per flight became routine. And in one 24-hour period, each aircraft was kept in the air for 23 hours and 10 minutes.

It was long, hard work for pilots in the air and crews on the ground. But they kept at it – determined not only to beat their schedule but to demonstrate convincingly to others the firm, determined faith they have in the future of turbo-prop power.

Under Lt. Col. Samuel C. Burgess, Commander, the work of the 1700th Test Squadron will continue with other aircraft powered with turbo-prop engines. But the pioneering phase of the program is concluding. The rest of the program has been aided immeasurably by the experience gained with the first aircraft assigned to the project.

We at Allison salute the good work of the men of the 1700th Test Squadron. We are proud to have been part of the project. You have proved that turbo-prop engines and propellers are "ready to go" and we are gratified that the convincing demonstration was made with Allison Turbo-Prop engines and Aeroproducts Propellers.

ALLISON
TURBO-PROP ENGINES

Allison Division of General Motors
Indianapolis, Indiana

Helicopters have long since proved themselves as the most effective machine available for saving lives and alleviating suffering in public welfare work. Here's one of New York City's police helicopters, a Bell, rescuing an exposure victim from a raft. New York City has been using police helicopters since 1948. It now operates a fleet of five Bells.

Federal Aid to Finance Co

Over 500 persons were saved by helicopter pilots in recent New England floods. This Hartford Times photo from Kaman Aircraft Corp., shows one of Kaman's two flood-relief HOK copters in the act of saving a man's life by lifting him out of the water to high ground. Kaman Test Pilot Al Newton was the pilot. Newton rescued 13 persons during heavy rain. He and another Kaman test pilot, Pete Russell, began rescuing Connecticut flood sufferers hours before military copter units arrived. They flew under direction of state police disaster squads.

By VAL PETERSON
Federal Civil Defense Administrator

CIVIL defense is calling on a modern air tool — the helicopter — to help it meet the threat of airborne nuclear warfare. As Federal Civil Defense Administrator and a licensed helicopter pilot, I want to report my agency ready and eager to help the states and their political subdivisions buy helicopters for civil defense needs.

We're eager because, after months of study, actual use, and hard figuring we're convinced that the helicopter is ideally suited to meet many of the unconventional problems facing civil defense in a super-weapon era that demands super-defense imagination for survival.

FCDA, through the Federal matching grants-in-aid program, is ready to pay half the cost of civil defense helicopters purchased by states, cities or counties.

This is a new step by my agency, but in many ways it was an inevitable one. A look at just one phase of the dilemma the United States and the free world faces will show why.

Military science has developed nuclear weapons of such unbelievably destructive power that one bomb dropped on a city — any city — can put it out of commission in a matter of seconds. This is not scare propaganda. This is blunt fact as stated by Atomic Energy Commission Chairman Lewis Strauss.

Another blunt fact: There is no shelter strong enough to deny the death blow of a strike by a nuclear weapon exploding with the power of 20,000,000 tons of TNT, and burning with the heat of the sun.

The growing magnitude of this concept of warfare is just one part of the problem facing 20th Century man, who must somehow match his scientifically-inventive genius with a power and will to survive it.

Mercy missions flown by Hiller commercial helicopters have dramatized the helicopter's disaster relief role around the world. Here's a Hiller with rope ladder picking up victims of Holland's recent disastrous floods. This Hiller was rushed into the flood work by the Paris magazine "Match," which owns the machine. Many foreign governments now operate commercial helicopters for disaster relief.

Community Copters for Civil Defense

Communist Russia has the super nuclear weapon in its varied arsenal. It has the capability of delivering it to any community in the United States. By Communist philosophy, it also has the motive.

What does this mean to the free world? What does it mean to the millions of American men and women living in and working in our great metropolitan areas and industrial centers — the bulls-eyes of the hydrogen age?

It means just one thing. The people can't be there when the bomb falls. Not if they are to survive. Not if this nation is to survive.

We are going to have to move by the millions out of target areas before an anticipated attack. We are going to have to move out in a matter of a few hours, and we are going to have to feed ourselves, shelter ourselves, and treat the injured and ill under what may be very primitive conditions.

This would be evacuation on a scale never before attempted — a calculated dispersal aimed at saving the lives and skills of as many Americans as possible so that our nation could fight back.

To conduct our research, make our plans, test them and be prepared to carry out mass evacuations under emergency conditions, we are going to need every form of assistance we can devise. We are going to need the best brains this nation has to offer. We are going to need the best tools it can forge. And we are going to need them in quantity.

The Federal Civil Defense Administration, with the backing of Congress and the President, is ready to spend millions to develop survival plans for the nation's critical target areas. We want realistic plans, and we are ready to lay money on the line to help buy the tools necessary to make the plans a success.

The helicopter is one of those tools.

Of course, the idea of the helicopter isn't new. A drawing by Leonardo da Vinci nearly 500 years ago depicted it. But the general appreciation of the value of such an aircraft dates back only a few years to the Korean War when our military proved it could serve many useful purposes.

By the same token, civil defense isn't new. American pioneers knew what it meant to band together to protect themselves, their families and their neighbors. But today, in the nuclear age, the scope of civil defense has grown enormously.

So it is fitting that the old-new helicopter and the old-new civil defense join as partners for modern civilian preparedness.

I know what helicopters can do. I

(Continued on page 44)

Text of Authorization for Copter Costs

HERE is the full text of the Civil Defense Administration's Chapter 13, entitled "Helicopter Contributions Program", from the FCDA Manual M25-1:

CHAPTER 13
HELICOPTER CONTRIBUTIONS PROGRAM

13.1 PURPOSE

The purpose of this chapter is to prescribe the criteria and procedures for obtaining Federal contributions for helicopters.

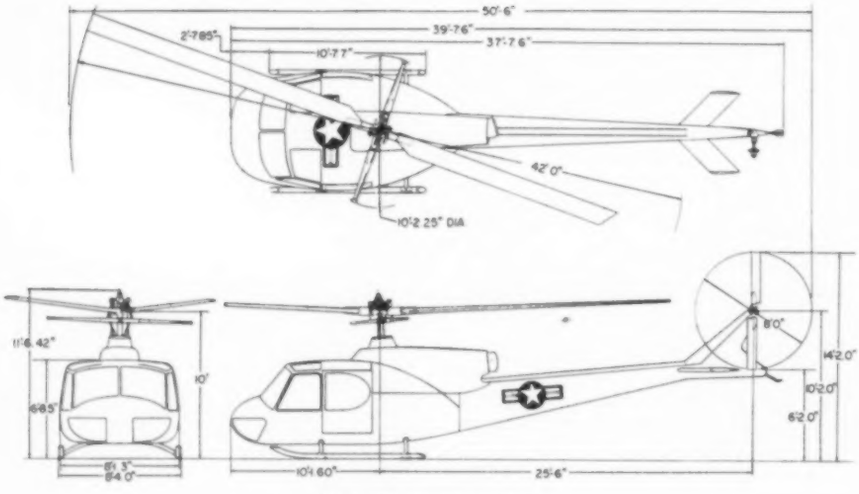
13.2 OBJECTIVE

The objective of the helicopter contributions program is to assist States and their political subdivisions in acquiring organizational equipment for emergency operations and to assure

(Continued on page 44)

First mock-up photos and design details show the low silhouette and compact design of the Army's new Bell XH-40 6-place utility copter, powered by a new Lycoming XT-53 turbine in the 700-825-hp. class. Its cabin measures 6 ft. 8 ins. high, 8 ft. wide and 10 ft. long from nose to rear seat bulkhead.

—(Bell Photos.)



Bell XH-40 Dimensions

Progress Package

SIGNIFICANT progress is reflected in the Army's new XH-40 utility helicopter now being readied for production at Bell Aircraft Corporation's helicopter division. The design not only incorporates numerous new developments, featuring a new Lycoming turbine in the 700-825-hp. bracket, but benefits from all the lessons learned from nearly 2,000,000 hours of flying logged by Bell helicopters since they were commercially licensed by CAA in 1946 ten years ago.

Shown on these pages are the first photos of the XH-40 mock-up, completed only last month for military approval as the project gathered acceleration. Three XH-40's are being constructed for flight test.

While it is a military project, having won an industry-wide design competition last spring, the XH-40 as the newest helicopter on the horizon is

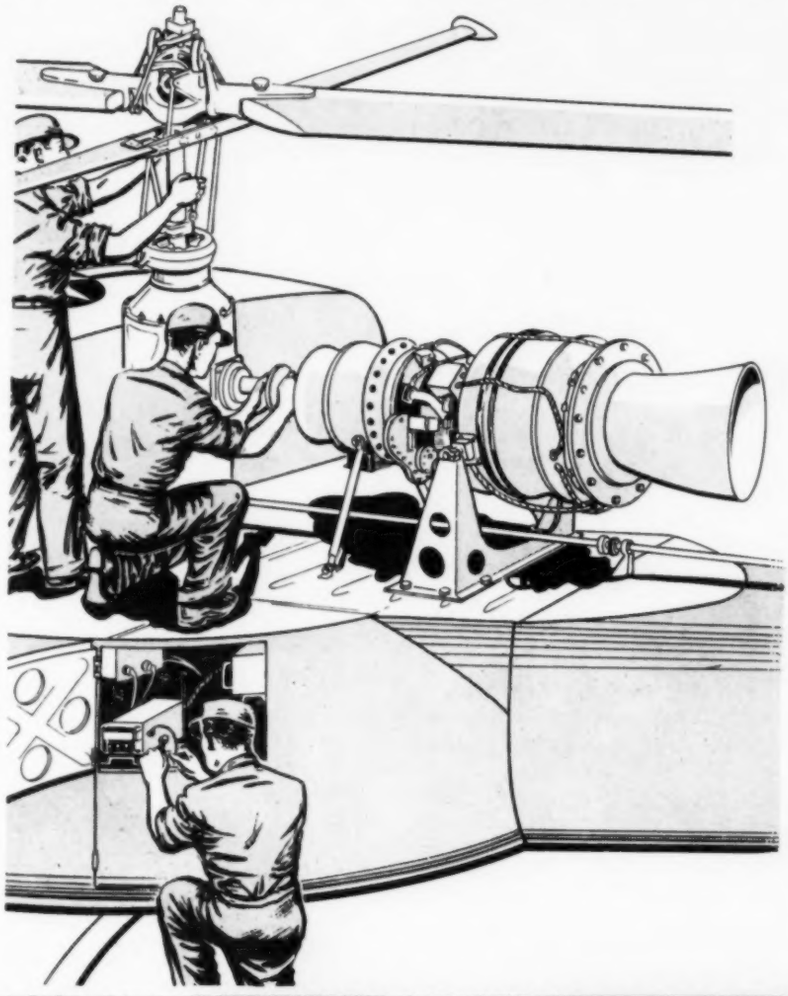
expected to have widespread commercial application and marketing.

High performance is the chief design goal, along with simplified maintenance and maximum utilization. One of its major assets will be its abundance of power, for it is a six-place machine apparently grossing about 5,000 to 6,000 lbs. With a power loading of less than 8 lbs. per hp., this should give it phenomenal performance, especially at altitude. Useful load will be better than 2,000 lbs. It will climb at 1,900 fpm. and hover above 15,000 ft. Range at gross weight exceeds 200 nautical miles.

New standards of mechanical integrity are expected of the XH-40, which is predicted to be the first helicopter having a 1,000-hour period between overhauls. All components are arranged for easy servicing or replacement in the field with simple tools. All-metal rotor blades and a new rotor hub design are used.

The XH-40's power plant is a new XT-53 turbine which Lycoming has been developing under the leadership of Dr. Anselm Franz, the man who designed the world's first mass-produced jet engine, which powered Germany's twin-jet Messerschmitt 262 fighter in World War II. This new Lycoming features a free turbine drive, which eliminates the need for a clutch in the new Bell's transmission. The Lycoming design emphasizes compactness and the engine appears to be less than 4.5 ft. long and less than 2 ft. in diameter. The Lycoming probably weighs less than 500 lbs. It combines 5 axial and 1 centrifugal compressor stages to achieve a 6 to 1 compression ratio, the single centrifugal compressor being the final stage. This avoids aerodynamic, manufacturing and cost difficulties which additional axial stages would involve in a turbine of the XT-53's small dimensions.

Engine specifics have not been released, but fuel consumption is expected to be down around .7 lbs. per hp. hour. The engine is being developed in two versions, one for helicopter application and another as a turbo-prop for airplanes. ★ ★ ★



These photos and the sketch above emphasize the serviceability designed into the XH-40, which will gross between 5,000 and 6,000 lbs. with a useful load of better than 2,000 lbs. Note access to tail rotor and built-in work platforms for engine and rotor, eliminating need for portable stands.
—(Bell Photos and Sketch.)

Largest available commercial helicopter is the new Sikorsky S-58, powered by a 1,525-hp. Wright Cyclone C9 engine and seating 12 passengers with crew of 2. Useful load is 5,070 lbs. at 12,600-lb. gross weight, with 104-mph. cruising speed, 220-gal. fuel capacity and 270-mile normal range. It is priced at $250,000 and deliveries begin in mid-1956. —(Sikorsky Photo.)

Industry Roundup

MILITARY projects still dominate the helicopter manufacturing industry, but there are six commercial models currently being produced and marketed by three manufacturers with other manufacturers expected to begin commercial marketing of three new models next year.

Those which are now available for civil use include the 3-place $36,800 new Hiller 12-C, Bell's 3-place Models 47G, 47G-2 and 47H at $39,750 to $47,500, and Sikorsky's 10-place S-55 at $150,000 and 14-place S-58 at $250,000.

Bell is beginning production of its first 4-place utility helicopter, the Model 47J, but has not yet priced it. Cessna has not priced its 2- to 4-place Model CH-1 and is expected to sell it to the military before offering it commercially. Piasecki is obtaining CAA commercial licensing for its civil airline transport version of the military H-21. Doman is obtaining CAA licensing for its 8-seat, 400-hp. LZ-5.

Largest producer of commercial helicopters is Bell Aircraft Corporation, whose helicopter division near Fort Worth is greatly increasing production for 1956 after sales reached another new high in 1955, as in each of the last two years. Bell's 1955 commercial sales exceeded 100 machines and are expected to run fifty per cent more than that figure for next year. Trends in Bell sales are discussed by Sales Manager Cully Weadock on page 35.

Hiller Helicopters at Palo Alto is now marketing its new Model 12-C, which features a bubble canopy and other improvements and is engaged in several significant military research projects including vertical rising aircraft other than helicopters. Hiller is also reported engaged in applying rotors to a large fixed-wing transport of another make in an experiment and is still engaged in CAA licensing of its small, 2-place ram-jet Hornet, although no commercial plans have yet been announced for it.

The nearest approach yet to a helicopter airliner approximating transport capabilities became a reality this year in the Sikorsky S-58. It is a single-engine machine, powered by a 1,525-hp. Wright Cyclone C9 R-1820-84 piston engine, and adheres to Sikorsky's single-rotor principle. With a crew of two and seats for 12 passengers, it carries a transport price

First flight photos of the twin-turbine Piasecki YH-16A for the Air Force show it flying last month. It is powered by two Allison YT-38 turbines and seats 40 troops or carries over 10,000 lbs. of cargo. A larger YH-16B version is being built and will seat 69 troops. —(Piasecki Photos.)

tag of about $250,000, with deliveries to commercial operators promised by mid-1956.

First commercial purchase of the S-58 was made by New York Airways, the certificated, scheduled metropolitan helicopter airline. NYA ordered seven of the Sikorskys. Letters of intent have already been received from Sabena Belgian Airlines, the pioneer international helicopter carrier, for 8 S-58's and from Okanagan, the commercial bush operation in Canada, for one S-58. Sikorsky sales experts estimate that 60 per cent of the S-58's to be manufactured will go to non-scheduled operators of commercial helicopters, indicating the rapidly growing importance of the commercial rotary-wing industry.

Sikorsky recently dedicated its large new helicopter factory at Stratford, Conn., where S-55's have been in limited production since mid-summer and where the twin-engine S-56 for military customers is now entering production. The S-58 is being produced in the Bridgeport plant. The new plant has 800,000 sq. ft. of area while that in Bridgeport has 700,000 sq. ft. In full production at both, Sikorsky will employ 10,000 persons as the largest American copter producer.

Current-Production Commercial Helicopters at a Glance

FACTORY DATA AS OF DECEMBER 1, 1955

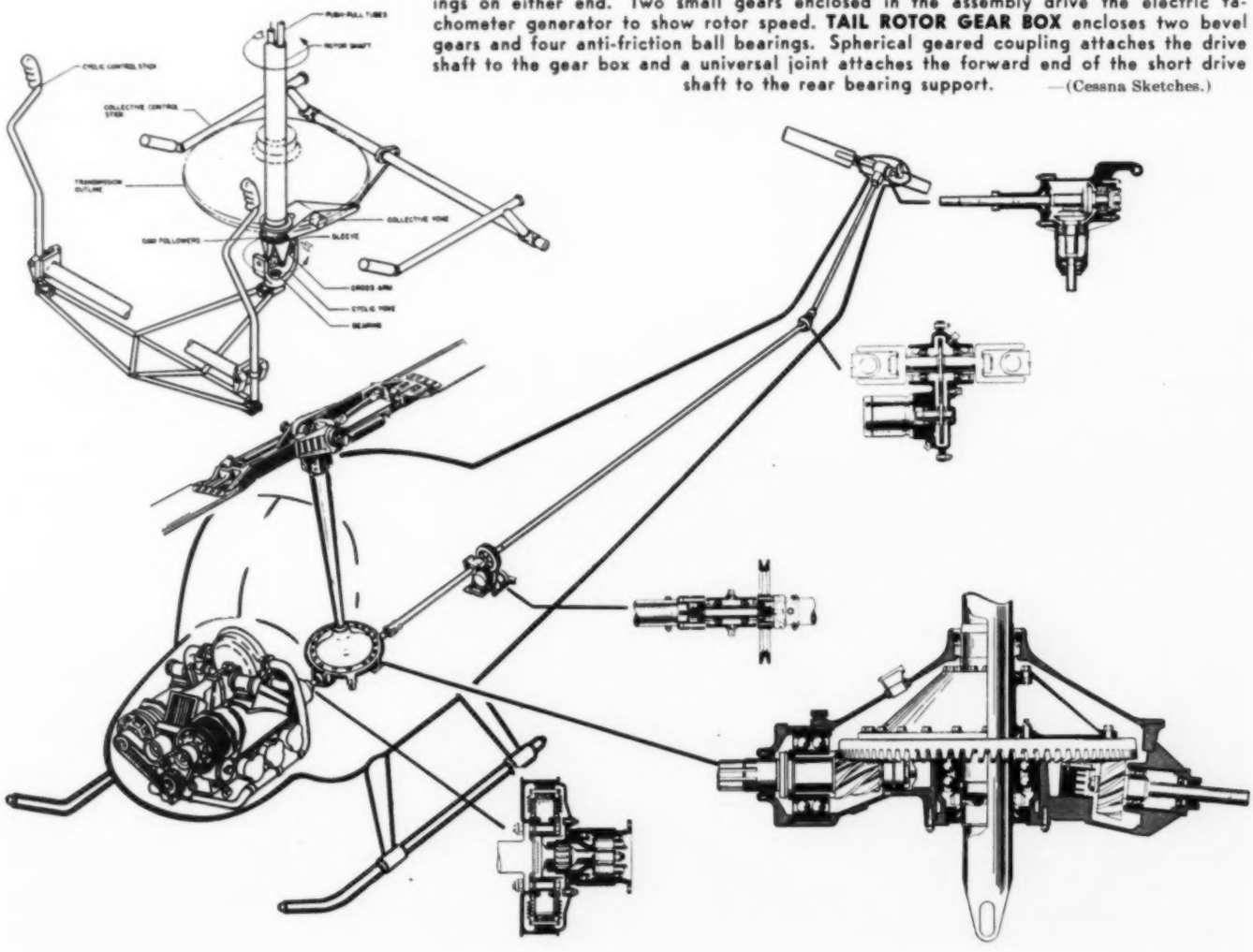
Make and Model	No. Places	Hp.	Gr. Wt. Lbs.	Useful Ld., Lbs.	Fuel, Gals.	Cr. Spd. Mph.	Price
Bell 47G	3	200	2,350	915	43	78	$ 39,750
Bell 47G-2	3	200*	2,350	795	43	85	$ 43,000
Bell 47H	3	200	2,350	885	35	90	$ 47,500**
Bell 47J	4	220*	2,565	1,065	35-50	100	N A
Cessna CH-1	2-4	260	3,000	1,025	60	100-120	N A
Hiller 12-C	3	200	2,500	858	28	71	$ 36,800
Sikorsky S-55	10	600	6,900	2,350	190	86	$150,000
Sikorsky S-58	14	1,525	12,600	5,070	220	104	$250,000

NOTES: *Derated 260 Lycoming. **Includes custom Deluxe interior.

Commercial concerns now operating S-55 Sikorsky helicopters include New York Airways with 5, Los Angeles Airways with 5, Sabena with 9 (three in the Congo); Osterman's of Sweden with 1; Humble Oil with 5 at Grand Isle, Louisiana; Petroleum Helicopters with 4 at Lafayette, La.; the California Company with 2 in the Gulf of Mexico tidelands; Hudson's Bay Mining and Smelting with 1 and Okanagan with 6 in Canada, and Sperry Gyroscope with 1.

In the smaller utility helicopters, the use of more powerful engines was the big news for 1955 — plus adaptation of improved streamlining. Bell went to the 260-hp. Lycoming engine

HELICOPTER INNOVATIONS IN THE NEW CESSNA CH-1 utility copter are diagramed below. **CONTROL SYSTEM** has its rotating assembly located below the transmission at the bottom of the rotor mast. The **SIMPLIFIED ROTOR ASSEMBLY** uses lightweight sheet-stainless steel angles as attaching members between rotor blades and hub. **HEAVY-DUTY TRANSMISSION** has only three spiral bevel gears. Bearings and gears in it are designed for a 3,000-hr. service life. **CENTRIFUGAL CLUTCH** (behind engine) has 12 spring-loaded shoes with bonded linings which engage above 1,400 rpm. outwardly against the drum. **FRONT BEARING SUPPORT** for the tail rotor drive includes a pully to power the generator. **REAR BEARING SUPPORT** uses a short shaft with bearings on either end. Two small gears enclosed in the assembly drive the electric tachometer generator to show rotor speed. **TAIL ROTOR GEAR BOX** encloses two bevel gears and four anti-friction ball bearings. Spherical geared coupling attaches the drive shaft to the gear box and a universal joint attaches the forward end of the short drive shaft to the rear bearing support. —(Cessna Sketches.)



LATEST XV-1 CONVERTIPLANE photo shows new redesigned pylon cap just above the insignia on the McDonnell craft. This cap reduces drag interference between the hub and pylon for improved efficiency. World's first successful convertiplane, its 550-hp. Continental engine drives a pusher propeller for forward flight using stub wings for lift and furnishes compressed air to rotor tip pressure jet burners for helicopter flight.
—(McDonnell Photo.)

for its new 3-place models, derating it down to 200 hp. This provides a significant reserve of additional power when needed, as for example in operating in hot weather or from high-elevation locations in the mountains. Hiller is now working with a derated Lycoming installation for its popular 3-place machine.

Of great promise in the Bell line of utility helicopters is its new 4-place Model 47J, which derates the 260 Lycoming to 220 hp. First demonstrated a year ago, it is now being produced for the military but will soon be available in 1956 for commercial customers. No price has been announced.

At Doman Helicopters, Inc., Danbury, Conn., where CAA type certification of the LZ-5 8-seat helicopter has been under way during the year, the tie-down endurance run has been successfully completed and CAA flight evaluation is all that remains to be done, according to Sales Manager Giles Montgomery. Production planning has been completed for plant expansion, tooling and manufacture of the LZ-5 and company management has been strengthened. Donald S. B. Waters, of broad experience in management, is president. Glidden S. Doman, chairman, is also serving as vice president of engineering, a new office. Thomas E. Zeerip is director of manufacturing, John W. Mazur heads the military contracts department and Ward Davis is supervising intensive studies in all-weather instrument flying. Doman's Canadian affiliate, Doman-Fleet Helicopters, is manufacturing the first production Doman helicopters in Canada and the first LZ-5 made from its tools has been demonstrated during 1955. The LZ-5 is powered by an 8-cylinder, 400-hp. Lycoming flat engine. Doman-Fleet has also designed a large tri-motor helicopter in the 17,000-lb. class and it has been entered in the Canadian anti-submarine warfare competition.

Still a military producer, although it has announced intentions of turning out a commercial airline transport version of its 19-place H-21, Piasecki Helicopter Corp., Morton, Pa., has made the first test flights with its 40-passenger YH-16A Turbo Transporter, world's largest turbine-powered copter transport. It is powered by two Allison YT-38 turbines. The big 16-ton Air Force YH-16A has 82-ft. rotors and a 77.5-ft. fuselage. In its early tests, it has already demonstrated its ability to maintain altitude with one of its turbines shut off and at a normal load. This load and altitude were not immediately divulged. Data gathered from the YH-16A and its earlier YH-16 piston-engine counterpart are being used in building a third transport helicopter of even greater payload than the 5-7-ton cargo capacity of the YH-16A. This will be the YH-16B and it will carry 69 troops. Meanwhile, Piasecki is developing a new Navy HUP-4 version of its HUP-2, the new one having a 700-hp. Wright R-1300-3 engine. Existing HUP models operating now with the U. S. Navy and Army, Royal Canadian Navy and French Navy can be converted to the new configuration. Additional H-21 Work Horse military transports have been ordered. Piasecki, which employs 5,000 persons as compared to 3,700 a year ago, expects its 1955 sales to exceed last year's total of $48.5 million.

Many Piasecki and other makes of military helicopters participated in large-scale emergency rescue missions during 1955 civilian disasters. Over 50 Piaseckis flew 3,000 separate missions in these operations, the company reports. They were credited with rescuing over 8,500 persons and with carrying about 350,000 lbs. of food and emergency supplies. Disasters included in the tabulation were the Pennsylvania and Connecticut floods and the Tampico, Mexico, hurricanes and floods.

At McDonnell Aircraft in St. Louis, where the highly-promising XV-1 convertiplane is undergoing further flight tests after becoming the first convertiplane to accomplish mid-air conversion, engineering design and construction of the security-cloaked XHCH-1 cargo unloader helicopter is going forward. This is a military fly-

(Continued on page 40)

NEW PORTRAIT OF XV-3 CONVERTIPLANE shows trim lines of this 450-hp. Bell which made its first helicopter flights during 1955. It has not yet been flown with the wing-tip blades rotated forward for airplane flight. Bell officials report the XV-3 impressively satisfactory in first flights.
—(Bell Photo.)

Popular Bell Model 47H-1 (right) is widely used in commercial operations while Bell is getting into production on its new 4-place Model 47J (above) for 1956 marketing. Corporate use of helicopters for executive transportation is increasing rapidly. Bell's three different current-model 3-place helicopters are in the $34,000-$40,000 price range.
—(Bell Photos.)

Commercial Trends In Bell Helicopter Sales

By J. C. WEADOCK
Commercial Sales Manager, Helicopter Division, Bell Aircraft Corp.

SALES figures for Bell Aircraft Corporation indicate a healthy year-to-year growth in the commercial helicopter business. Bell already had delivered more helicopters as of Nov. 1 this year than in all of 1954 and anticipates closing the year with an increase of at least 30 per cent. It will be the fourth consecutive year in which Bell's commercial helicopter sales have hit an all-time high.

To date, Bell has manufactured nearly 1,500 helicopters since receiving the world's first CAA commercial certificate in 1946, and they have logged nearly 1,500,000 flight hours in operation throughout the world.

The steady rise in helicopter sales and utilization will continue in the years ahead without marked upswings or setbacks.

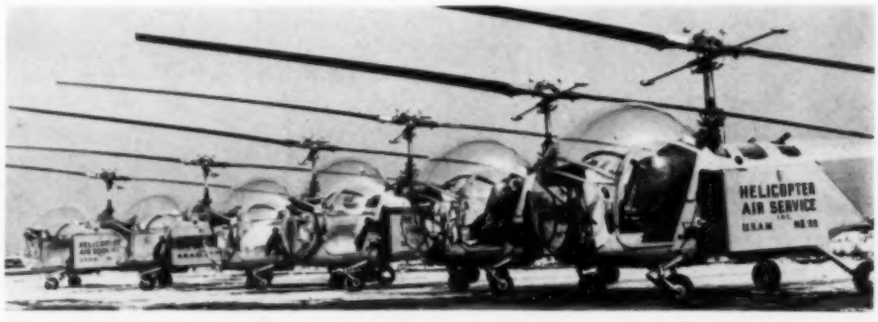
Helicopters are proving themselves to be money-makers for both charter and private operations. Future growth will come from both quarters. Established operators will be expanding their fleets and their success will help encourage formation of new operations.

Of all the commercial helicopters sold by Bell this year, 29.6 per cent were to new customers. The remainder went to established operators who, finding their machines profitable, came back for more. Among these is Helicopter Air Service of Chicago, which sold the six Model 47's with which it started business in 1949 and replaced them with a brand new fleet of six boost-control-equipped Bell Model 47G's.

Although all of HAS's helicopters had as many as 6,000 hours on them—and one had nearly 7,000 hours—the Chicago firm received as much as $22,000 for its old ships.

Pinpointing another trend is the fact that in 1953 a total of 70 per cent of Bell's commercial helicopter sales were to foreign operators. By 1954, domestic sales (U. S. and Canada) had climbed to 50 per cent of the total. This year, domestic sales accounted for

(Continued on page 73)



These six Bell 47's were flown an average of 6,000 hours each before Helicopter Air Service in Chicago replaced them with current models. The old models brought $22,000 each on the used copter market.

Here's Prime Minister Nehru in a Hiller purchased by the government of Bombay. Many foreign governments own and operate commercial 3-place, 200-hp. Hiller helicopters, using them for transportation, agriculture, insect control, disaster relief and survey.

Global Commercial Sales For Hiller Helicopters

By A. W. B. VINCENT
Vice President, Commercial Sales Division, Hiller Helicopters

THE Commercial Division of Hiller Helicopter handles not only non-military sales within the United States, but also all sales to foreign countries, whether the buyer is a government agency or private business. In its global sales activities it has used many new and hitherto untried marketing techniques because of the nature of the problem; and there is indeed some gratification in the feeling that the company has materially assisted in pioneering acceptance of a flight principle which will influence all future aviation.

Up to the present time, Hiller aircraft have been operated in more than fifty countries, and have regularly been shipped to distant lands which had never before seen a helicopter.

To accomplish this necessitated not only a world-wide distributorship system to coordinate sales and service, but also efforts by the company to provide miscellaneous services necessary to the introduction of new aircraft, such as pilot and mechanic training, sending of technical representatives, assistance in formulating operating procedures, and so on.

New Areas Opened Up

Numerous examples can be given of far-off countries in which Hiller 360's and 12-B's pioneered rotary-wing flight.

In New Zealand, a 12-B sold to O. G. James, of Helicopter Services, Ltd., Hamilton, was put into operation for agricultural and other types of charter work in early 1955, and aroused great interest throughout government and business circles as the country's first helicopter. For the first time helicopter characteristics and potential were demonstrated to civic leaders.

In Indonesia, the Air Force acquired two 360's in 1950, and recently added a 12-B, which are used for pilot and mechanic training, and to familiarize the Air Force with helicopter operation. Located on Andir Airfield, Bandung, Java, the program is coordinated by Lts. R. and J. Soemarsono.

Before the government of Bombay, India, purchased a 12-B in 1953, no helicopter had been seen in that country. In a typical mission, Hiller Pilot Mike Meger and Technical Representative Kirby Achee accompanied the machine to India to set up operations and train personnel. General M. J. B. Maneckji, commandant of the Bombay Home Guards, is in charge of the many missions for which the 12-B is used, including transportation of important officials.

At Ekron Air Base, Tel Aviv, the Israel Air Force initiated its first helicopter flight training program with Hiller 360's purchased several years ago.

At Colombo, Ceylon, the Department of Civil Aviation felt the need for a helicopter familiarization program in 1953, and purchased a 12-B, which has since been put to extensive use; in Madagascar, 360's have pioneered various helicopter operations since 1950.

In the Danube area, south of Belgrade, Jugoslovenski Aerotransport has concentrated on agricultural work, amazing residents of the country with helicopter spraying of gypsy moths to save valuable timberland. Chief Pilot Stanislav Dzodzovic has also successfully demonstrated many other types of missions for helicopters in the rugged terrain of Yugoslavia.

Recently, Ecuador also joined the growing list of countries using helicopters when Sociedad Agricola and Industrial, in Guayaquil, purchased a Hiller 12-B. Juan Marcos is president of this firm, and Harry M. Crawford is the pilot.

In the course of development of commercial helicopter use, a number of operations have been outstanding for their impact on the aviation world, concerning either unusual success or large scale applications of rotary-wing aircraft.

In Thailand, the government has long used the most modern approach

to solving problems of transportation for its police force and government officials. Since 1949 the Siamese Police Force has been using Hiller 360's in missions such as traffic and law enforcement, border patrol and transportation; the success of these missions was so apparent that Hiller 12-B's have been added to the fleet until today this agency employs fifteen Hillers to carry on its work more efficiently.

Hillers are also operated in Siam by the Siamese Air Force and by the Thai Sugar Organization. Hiller's distributor in Siam, the Sangar Bhanich Company, Ltd., has played a leading role in initiating these operations.

In England, Fison-Airwork, Ltd., operates a fleet of nine Hillers, sending them to all parts of the world for every type of helicopter operation. Originally Fisons Pest Control, Ltd., headed by Dr. W. E. Ripper, pioneered the use of Hillers in agricultural work done by that firm, but as the potential of the helicopter grew and the company acquired more aircraft, Airwork, Ltd., became interested, and a merger was formed last May which combined one of the biggest airline operators with a firm unique in its experience concerning helicopters. J. E. Harper, chief pilot, and active since these operations were begun, is on the present Fison-Airwork board of directors, as is Dr. Ripper. M. D. N. Wyatt of Airwork is chairman.

More recently another step important in aviation annals was taken in England when Air Services Training, Ltd., the well-known "university of the air," acquired two Hiller 12-B's to incorporate helicopter pilot training into their extensive curriculum. Air Services Training is an establishment devoted entirely to the training of pilots, crews, and mechanics, and now is able to offer complete training facilities for helicopter personnel.

In 1953, the Philippine Air Lines, with headquarters in Manila, purchased two Hiller 12-B's to initiate a program of helicopter familiarization into its domestic operations in the islands, and has since purchased three more 12-B's to give it a fleet of five.

In setting up this operation Colonel Andres Soriano, president of PAL, stated, "We have been investigating for some time the use of helicopter equipment to supplement our present public services in the Philippines. We believe that the helicopter potential in the Philippines is unusually interesting, and that in the future it will ideally fit into a major expansion of our inter-island passenger and cargo program."

Present operations in the Philippines include such missions as payroll drops, crop dusting, timber cruising, emergency work and other charter assignments. J. H. Manzano, in charge of helicopter operations for PAL, reports that monthly helicopter utilization has averaged approximately 250 flying hours.

In Paris, France, Commandant Henry Boris, president of Helicop-Air, has not only been a leading distributor and star salesman for Hiller helicopters since he joined the company's system in 1949, but has also earned the title of "Mr. Helicopter" throughout Europe for his aggressive promotion of all types of rotary-wing activities. In addition to complete sales and service facilities, his company trains pilots and mechanics and coordinates operations of many dealers throughout European countries and their colonies.

Through his sales organization, Commandant Boris has placed Hiller helicopters in England, France, Belgium, Italy, Norway, Yugoslavia, Holland, Algeria, Switzerland, Madagascar, Indochina, and Germany, where they have pioneered helicopter applications in business, agriculture and government and military service.

As an example of industrial use in the United States, the Texas Gulf Sulphur Company, with headquarters in Newgulf, Texas, has long used a fleet of Hiller 360's in its operations for the manufacturing of sulphur, including exploration work. Its subsidiary, Cia Exploradora del Istmo, conducts operations in Mexico also using Hillers. H. E. Treichler, former vice president and general manager of the firm, played a leading role in the company's adoption of helicopters to save time and money for its field work.

Through its Mutual Defense Assistance Pact, the United States has been instrumental in aiding several foreign countries which could not otherwise have initiated helicopter programs, and the Hiller Commercial Sales Division has cooperated in a few of these for which Hiller helicopters were chosen.

In England, twenty Hiller trainers were acquired by the British Royal Navy for helicopter training purposes and are now in service there.

Of interest in connection with the English program is the fact that the Duke of Edinburgh took a course of helicopter flight training in a Hiller machine of the Royal Navy.

In Holland, thirty-five Army-designated H-23B helicopters are now located at Deelen Air Base, having been provided under the MDAP. Using these aircraft, Holland's first helicopter flight training was initiated in the summer of 1955, and is presently proceeding ahead of scheduled plans. A number of students have already been

(Continued on page 66)

New Zealand's first helicopter is a Hiller 12-B, shown above during an Auckland public ceremony. Industry use of Hiller copters is growing in Africa, the photo below showing one of two Hillers used by Shell in Nigeria for oil development — Shell flies personnel between locations, sprays base camps for pest control and performs emergency tasks with its copters.

A load of helicopter passengers, brought to Los Angeles International Airport from outlying communities, is moved from a Los Angeles Airways copter to trunk airliners for connections without having to enter the terminal building. Eighty per cent of LAA's copter passengers are connecting fares. Hours of surface travel are saved but copter connection adds only $2 to a transcontinental air ticket. —(Los Angeles Airways Photo.)

Copters Prove Metropolitan Service

A pioneer details how Los Angeles Airways solves traffic problems

By CLARENCE M. BELINN
President, Los Angeles Airways, Inc.

THE helicopter, as a metropolitan transportation vehicle, is the only vehicle capable of solving the new transportation problem of congested areas, such as the greater Los Angeles metropolitan area.

Fixed-wing airplanes must land at airports, which are generally separated from the cities by congested highways. Busses, trucks and automobiles are confined to these highways and are, themselves, the cause of congestion. The railroad, which has the advantage of a private right-of-way and the privilege of moving faster than anything else on the ground, can't leave its tracks or its terminals. The steamship stops when it reaches shore, and it discharges its passengers and cargo into a veritable maelstrom along the water front. But the helicopter, given a modest landing spot, can hop over these obstacles like a Knight on a chess board and thus conquer these transportation bottlenecks.

Los Angeles Airways, certificated by the Civil Aeronautics Board in 1947 as the world's first scheduled helicopter airline, inaugurated air mail schedules the same year. In 1953, we began the first helicopter air express service and commenced helicopter passenger schedules in late 1954.

We currently operate five Sikorsky S-55's, outfitted for 7 passengers plus mail, express and freight, and two Sikorsky S-51's.

Our first year of scheduled helicopter passenger service has shown that LAA's real passenger job is that of supplemental and feeder service to the trunk air carriers. This job is performed best by offering two classes of service. The first is a combination service providing passenger space in combination with mail and express on regular flights. An interesting element of LAA's service pattern is that on many flights, the mail and express travel in reverse direction to the passenger loads, which naturally means better utilization of equipment.

The second type of service, for passengers only, is a short-haul arrangement called "shuttle service." Shuttle flights are set up to serve the communities which are heavy users of airline service and which are restricted as far as combination service is concerned, or which need more service than that supplied by combination flights. Also, in filling many blank spots through the day with shuttle flights, and making direct field transfers with specific airline trips, LAA is able to attain higher utilization from its equipment and personnel. On the helicopters we use for both passenger shuttles and combination flights, the daily average hours flown is as much as 8 to 10 hours.

Perhaps at this point we can discuss a few of the specific questions asked us, such as: How were the fares on LAA determined? Who rides on LAA? Why? What are the peak hours? What is the average speed of the S-55 and average fuel consumption? Average altitude flown? What are the heliport requirements? What

(Continued on page 46)

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INDUSTRY ROUNDUP

(Continued from page 34)

ing crane of unusual importance as a vehicle for proving large pressure-jet rotor design in moving very heavy suspended loads over relatively short distances. Although McDonnell helicopter activities have received only modest mention in the past, the firm is known for its top-ranking experiments in tip burning for rotary-wing power. It is aiming at a more prominent role in future commercial and military applications of rotary-wing aircraft to short-haul air transportation.

Heliport considerations and all-weather helicopter instrumentation and navigation are still the subject of development in many quarters. Several equipment manufacturers, including Sperry Gyroscope and Bell Aircraft, are well advanced in new instrumentation and autopilot developments for copters. All-weather operations are generally conceded to be dependent on the development of multi-engine helicopters, which are still in the "promise" stage except for the Piasecki twin-turbine development for the Air Force. Most helicopter operators have now agreed that commercial helicopter transport traffic will be most effectively controlled not on a basis similar to airways for fixed-wing aircraft but in a manner in which surface expressways have solved many automotive traffic problems. This would provide well-defined controlled-access lanes to and from heliports with separate traffic lanes.

LYCOMING TURBINE EXPERT Anselm Franz is pictured here by a mock-up of the new XT-53 turbine developed by Lycoming under his supervision. It is in the 700-825-hp. class and powers the new Bell XH-40 utility helicopter for the Army. Dr. Franz designed the jets which powered Germany's World War II Messerschmitt 262 fighter. He believes small jets can be made as efficient as large ones. —(Bell Photo.)

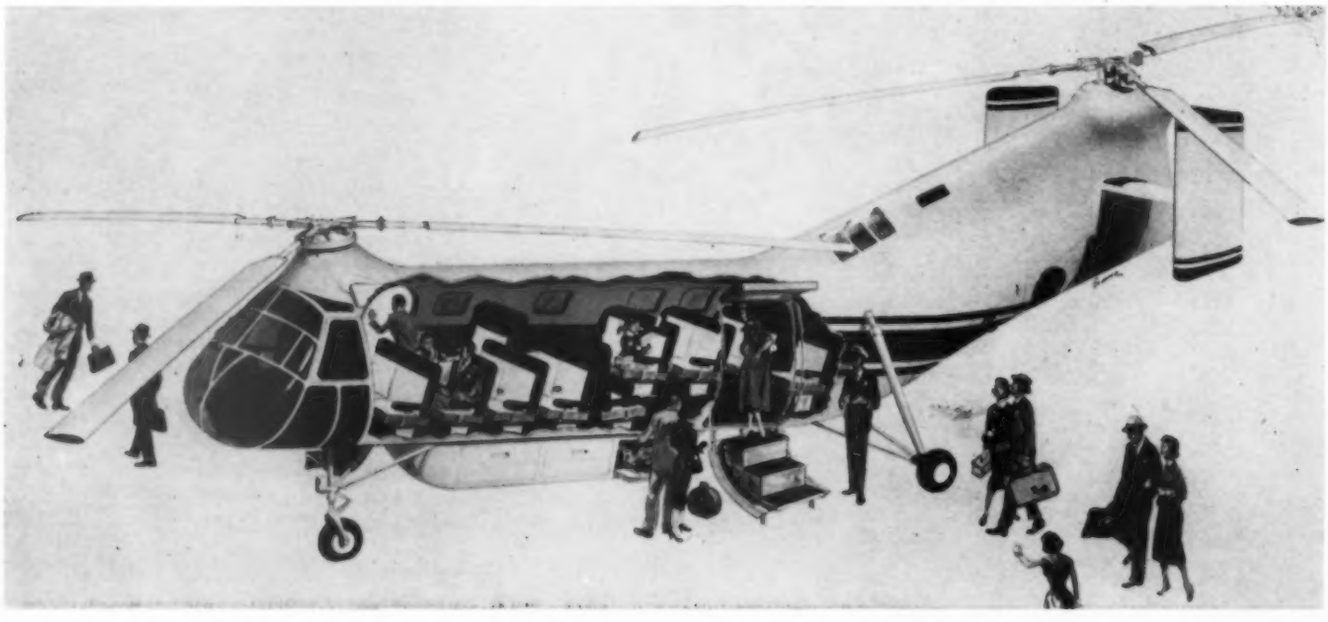
Anselme Vernieuwe of Sabena, one of the world's foremost authorities on helicopter airline operations, emphasizes that helicopters more nearly resemble surface vehicles than air transports in their traffic problems. Therefore the helicopter's route structure will be more complex and varied than that of the airliner. Confined to lower levels of air space, its system of traffic control will mainly have to provide lateral and longitudinal separation and will be deprived of the possibility of using vertical separation to any great extent. So the logical approach is to look to surface expressways rather than to air traffic systems for possible solutions to copter problems.

"The system of the express highways is the one which in our opinion will form the basis for helicopter highways in the sky," Vernieuwe says. Fixed-wing and rotary-wing traffic should be separate as far as practical.

He lists the important requirements for these all-weather helicopter highways as follows:

1. They should provide the shortest possible route between two or several centers.
2. They should not penetrate into the centers they serve but should bypass them, with short, secondary feeder routes going to and from the centers to the main highways.
3. They should be clearly marked and easy to follow.
4. There should be no crossings to complicate the structure and its operation — instead there should be overpasses and underpasses.
5. They should be one-way roads.
6. To cater to traffic at different cruising speeds, there should possibly be several parallel lanes as this will reduce the problems of overtaking aircraft.
7. The route structure of fixed-wing and rotary-wing aircraft should be independent and mixed traffic should be avoided at all costs, except where a helicopter service to a fixed-wing airport is operated. ★ ★ ★

PIASECKI PH-42 COMMERCIAL AIRLINE HELICOPTER TRANSPORT, now being certificated by CAA, will seat 19 passengers between tandem rotors. A single-engine copter, it is powered by a 1,425-hp. Wright R-1820-103 and will have a 4,570-lb. useful load at a 13,300-lb. gross weight. Cruising speed will be 98-109 mph. with a 338-mile range. Delivery in 1956 is scheduled. This will be a commercial version of the military H-21C Work Horse. —(Piasecki Sketch.)



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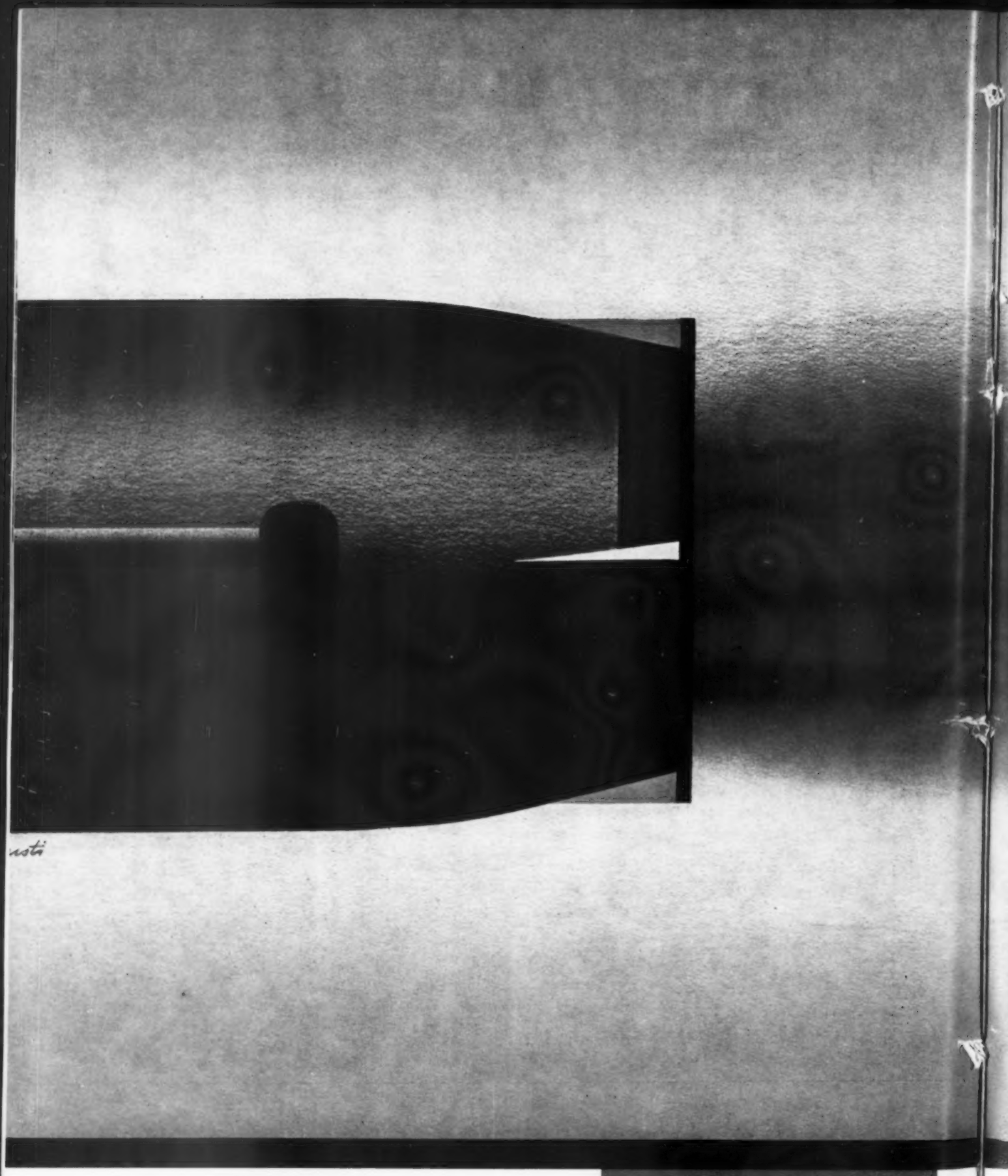

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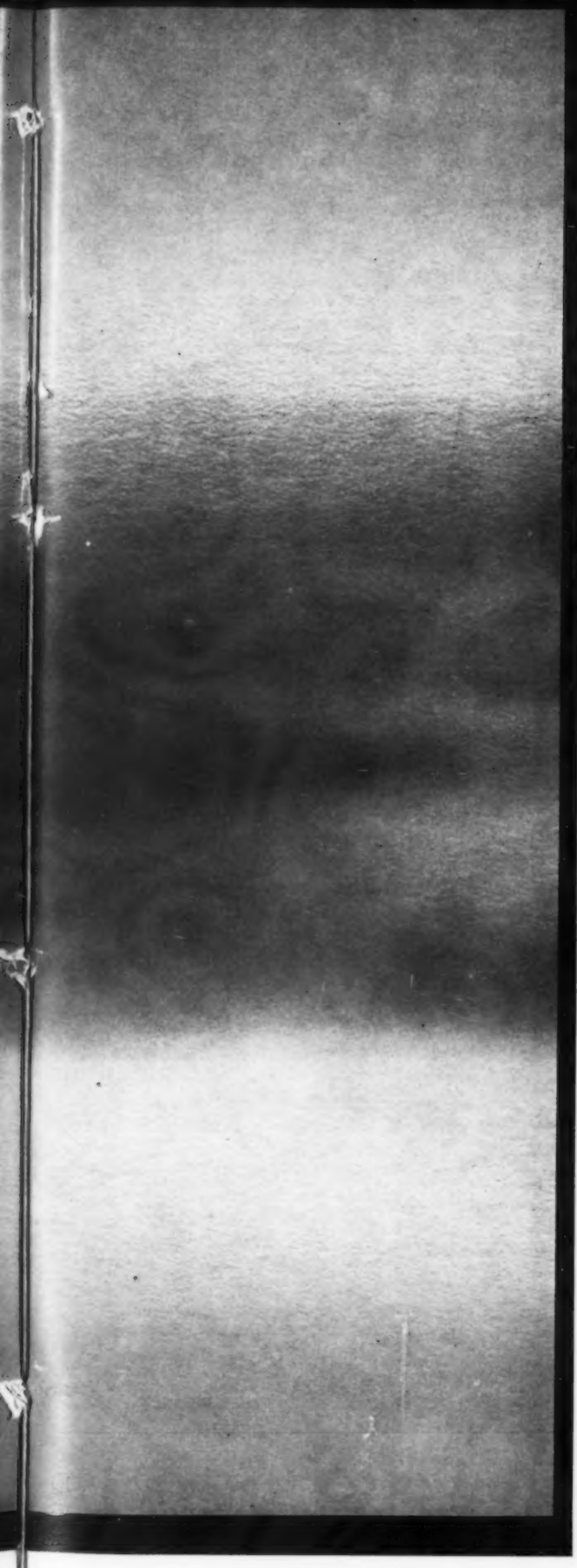

Lycoming harnesses the hot breath of a new era

Now, in the lungs of Lycoming's advanced gas turbines developed for the Military—the turbine principle finds new usefulness, this time for helicopters. Employing broad knowledge and bold thinking in aerodynamics, thermodynamics, and metallurgy, scientists of Avco's Lycoming Division have achieved in the T 53 turbine important design advantages: dramatic compactness (never before has 800 H. P. been housed in so little space), versatility in installation and operating characteristics, high efficiency, ruggedness, long life, and low production cost. The T 53, developed in close cooperation with the U. S. Air Force and U. S. Army Transportation Corps for helicopter use, also broadens the benefits of turbine power to fixed wing aircraft and many other mobile and stationary applications. Through advanced turbines—as well as improved reciprocating engines, better components, finer precision parts —Lycoming translates research into practical realities for defense, for peace.

The turbine era is here. A broad variety of future non-military applications of gas turbines awaits the ingenuity of industry. If your plans are in any way linked to power—turbine or reciprocating—now is the time to look to Lycoming! Write on your letterhead to Lycoming, Stratford, Conn. Ask for T-53 booklet.

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TODAY'S MILITARY SERVICES, WITH THEIR TREMENDOUS TECHNOLOGICAL ADVANCES MADE POSSIBLE THROUGH SCIENCE, OFFER A VITAL REWARDING CAREER

CIVIL DEFENSE COPTERS

(Continued from page 29)

fly them, and can see an almost limitless use for them in civil defense.

Take evacuation planning. By using helicopters to get up and over the problem, we can better pick the right evacuation routes. We can get a bird's-eye view of potential traffic bottlenecks, and survey areas where new routes should be built. We can select logical reception areas for evacuees. We can use helicopters in a number of ways to train civil defense personnel in communications, damage assessment, search and rescue work, to name a few.

During an evacuation, helicopters would be almost indispensable — reporting the progress of movement, spotting traffic obstructions and reporting them (possibly dropping to the ground to lend first-hand assistance) maintaining communications along the evacuation routes. By mounting powerful voice amplifiers on helicopters to give civil defense news and instructions to evacuees, minimizing the danger of panic by keeping everyone well informed.

Toward the end of the evacuation or after it is over, helicopters could easily go in and out of reception areas, taking in food and medical supplies and helping to transport other equipment and personnel wherever they are needed.

They could be used to assess damage and rescue the injured. They could serve as airborne platforms for civil defense radiological monitoring teams, allowing the teams to measure and report the level of radioactivity in various areas without subjecting team personnel to undue radiological hazards.

Helicopters could be used, in fact are being used, by civil defense units working in natural disaster areas. Two years ago I received my first experience on the value of the helicopter to civil defense in combating natural disasters.

Federal Civil Defense coordinates federal assistance in disaster areas, and as agency administrator I surveyed the tornado-stricken areas of Flint, Mich., and Worchester, Mass., from a helicopter. From that vantage point, I gained far more information on the extent of the damage than I would have received by making a ground survey. Of course, in recent years there have been a number of examples of the use of helicopters in life-saving and other emergency relief work. They were invaluable during the floods in the northeast late in the summer.

Since 1953, I and others in FCDA have been urging state and local civil defense authorities to investigate the use of the helicopter in improving the operational effectiveness of their CD plans. Now we can back our urgings with hard cash.

A helicopter pilot himself, Federal Civil Defense Administrator Val Peterson is shown (right) with Joe Mashman of Bell.

Instructions for the procedures to follow in participating in the matching fund program for the purchase of civil defense helicopters are available at FCDA headquarters in Battle Creek, Michigan, at FCDA regional offices, and civil defense headquarters in the states.

The estimated cost of a three-place helicopter, meeting the design specifications under the program, and basic equipment, is about $35,000.

In addition, other items eligible for purchase under the helicopter matching-fund program include aeronautical instruments and radio equipment to meet CAA minimum requirements for all-weather flights, two-way radio, stretcher brackets, hoisting equipment, wire-laying equipment and public address equipment. Other equipment may be approved if there is evidence it will add to the effectiveness of the basic equipment.

In World War II, the Jeep was the "right hand" of the American soldier. We in civil defense, faced with an air threat and the necessity for mass ground movements of civilian populations, may find ourselves developing our own "right hand" in the helicopter.

★ ★ ★

TEXT OF AUTHORIZATION

(Continued from page 29)

more effective civil defense planning and training. While the usefulness of aircraft of all types in civil defense emergency and disaster operations has been amply demonstrated, this contributions program is concerned only with the acquisition of helicopters and auxiliary equipment and supplies. This is due to the versatility, special adaptability, and superior effectiveness of helicopters in performing highly specialized types of civil defense emergency operational functions, particularly in the fields of evacuation observation, traffic direction and control, damage assessment, radiological monitoring, attack warning, rescue, and communications.

13.3 ELIGIBLE ITEMS

a. Helicopters, of type, design, specifications, and price, as approved by the Administrator hereunder.

b. Aeronautical instruments and radio equipment to meet minimum requirements of CAA for all-weather flights.

c. The following non-aeronautical equipment, if essential to meet the established training and operations program of the civil defense organizations:

(1) Two-way radio
(2) Stretcher brackets
(3) Hoisting equipment
(4) Wire-laying equipment
(5) Public address equipment

d. Requests for additional equipment other than that listed should be supported by specifications and cost estimates, and evidence that it will add to the effectiveness of the basic equipment.

13.4 CRITERIA FOR APPROVAL

Federal contributions for helicopters, auxiliary equipment, and supplies may be approved, provided that:

a. A requirement for such equipment to support planning, training, and preparation for civil defense emergency operations can be demonstrated.

b. A definite program of civil defense planning, training, and preparation for civil defense emergency operations, acceptable to FCDA, has been formulated.

c. Equipment will be readily available for use in civil defense emergency.

d. Equipment will be made available in support of attacked areas in accordance with:

(1) intrastate mutual aid and mobile support plans,

(2) interstate compact, or

(3) agreement with appropriate FCDA Regional Offices as to the integration and utilization of the equipment in a manner consistent with the over-all State and local civil defense plans.

e. Its use will be restricted to the following types of civil defense activities:

(1) *Before an emergency:* Selection of evacuation routes; determining potential traffic bottlenecks; survey-

ing new and improved route potentials; studying evacuation areas for capacity, accessibility, and support facilities; training of crews and civil defense personnel in observation, traffic control, communications, damage assessment, radiological monitoring, fire observation reporting, search and rescue, and civil defense procedures; activities designed to stimulate interest in civil defense organization and activities.

(2) *During evacuation:* Observation and reporting of evacuation progress; observation of developments tending to restrict or prevent effective evacuation, such as over-loaded routes and other obstructions to traffic; observation to determine corrective measures; checking for, and warning, areas that have not received alert; assistance in the maintenance of effective front-to-rear and rear-to-front communications along evacuation routes; dissemination of civil defense news and instructions to evacuees; warning of inbound trains and water vessels.

(3) *Following evacuation:* Checking of evacuation reception areas to determine requirements for critical services or supplies, including medical, police, fire, food and water, fuel and shelter, monitoring and other related services; assisting in the transportation of personnel and equipment to alleviate distress; serving as communications medium between reception centers and control centers.

(4) *Following attack:* Determining areas and intensity of damage; determining fire areas, limits, and progress; determining conditions restricting fire control activities; determining available routes into and from damaged and fire areas for critical equipment and personnel; directing traffic control activities; deploying essential personnel in disaster areas, including radiological, medical, communicatons, fire, police, and others; locating and directing assistance to injured, shocked, or otherwise helpless survivors; transportation of casualties in need of specialized medical care; laying communications lines and transporting essential communications equipment; serving as communications medium for the relay of urgent messages and for the dissemination of civil defense news and instructions to survivors; conducting radiological monitoring operations; conducting bacteriological surveys; assisting in decontamination operations; performing police and general courier services; transporting priority medical supplies; conducting insect control spraying operations; rescuing casualties or uninjured persons trapped atop buildings or in encircled areas blocked to ground transportation; performance of other related services.

f. Equipment will be properly stored and maintained in an air-worthy condition in accordance with CAA requirements.

g. An effective dispersal plan has been, or will be, established for the equipment, if it is to be stored in or adjacent to a metropolitan area.

h. Flight operations will be conducted or directed by an airman certified by CAA with commercial pilot and helicopter ratings.

i. Equipment will be clearly identified at all times by appropriate civil defense markings.

j. Equipment will conform to FCDA specifications.

13.5 ADMINISTRATIVE REQUIREMENTS

a. FCDA will review the detailed justification (which will accompany the project application in accordance with paragraph 13.7) to determine that it reflects appropriate civil defense utilization of such equipment and that adequate civil defense plans have been formulated, which requires the use of this equipment for the efficient emergency execution of such plans.

b. FCDA will review the application and determine the propriety of the costs estimate therein contained. The State (or political subdivision thereof) having custody of the equipment will furnish such periodic reports on its use as may from time to time be required by FCDA.

13.6 AUTHORIZED USE FOR OTHER THAN OPERATIONAL CIVIL DEFENSE

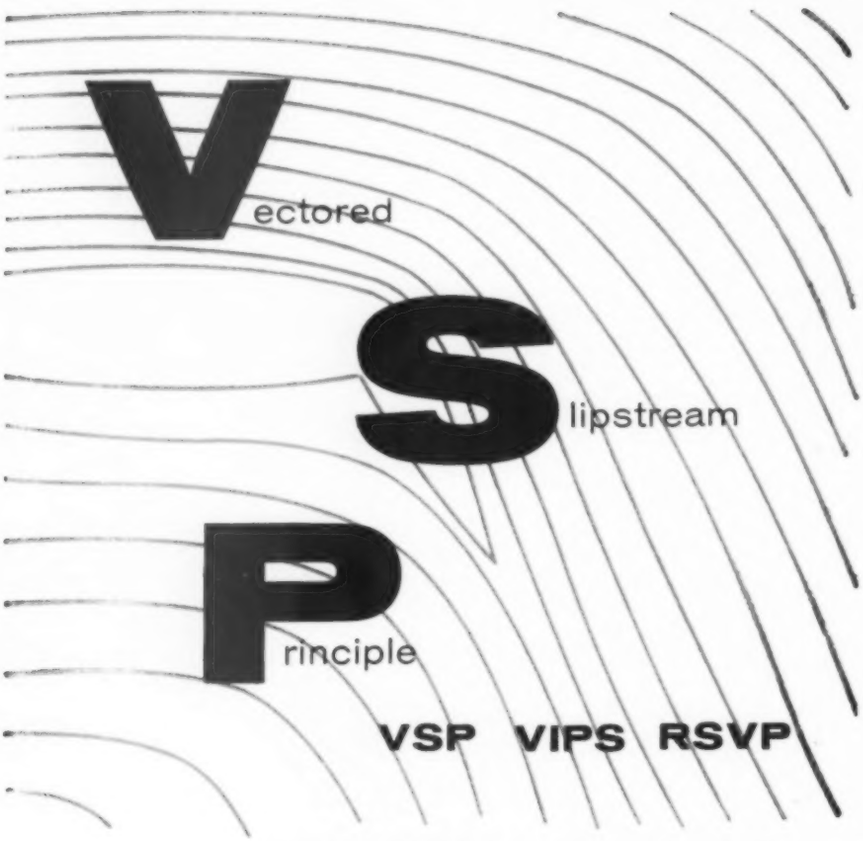
The uses of helicopters in major natural disaster operations are so obvious that they require no enumeration or elaboration. States and political subdivisions acquiring organizational equipment under this chapter are authorized and urged to fully utilize their helicopters and related equipment in combating major natural disasters, in accordance with this manual and FCDA Regulations, Part 1701, governing Federal contributions (see Annex I-A, Chapter 1).

13.7 PROJECT APPLICATIONS

Project applications shall be prepared in accordance with the provisions of Chapter 2, M25-1. Part III of each project application submitted will consist of a narrative justification describing in detail the manner in which the equipment will be utilized in the overall civil defense program. ★ ★ ★

Los Angeles County sheriff's department recently acquired a helicopter for its many needs in serving the public.

Over 175 children were rescued by fleets of Piasecki helicopters during recent Pennsylvania floods which engulfed island camps in the Delaware River. Company test pilots and Navy pilots at Piasecki Helicopter Corp., Morton, Pa., rushed into the rescue while Navy and Air Force helicopters joined in later.



Advanced research at Fairchild in the applications and effects of the Vectored Slipstream Principle has brought about the need for qualified aerodynamicists who have worked in this vital field, and who can make valuable contributions to its development.

Fairchild, producers of the famous C-119 *Flying Boxcar* and C-123 *Provider*, are now preparing transports, advance reconnaisance aircraft, fighters and missiles. Experienced aerodynamicists with VSP background will find these challenging new programs an exciting, stimulating climate in which to utilize and profit from their experience.

Investigate these forward-looking, pace-setting developments. If your experience and originality can advance Fairchild's rapidly-expanding program, you can be sure there's a big future waiting for you at Fairchild.

Investigate, too, the superb conditions for living and working near urban Baltimore and Washington, in the attractive Cumberland Valley. Fairchild offers outstanding company benefits: salary plans . . . paid pensions . . . health, hospitalization and life insurance . . . the many *extra* advantages of working with a genuinely progressive, fast-growing organization.

Send a detailed resume of your experience to Walter Tydon, Chief Engineer. All correspondence will be kept in strictest confidence, of course.

"where the future is measured in light-years"

ENGINE AND AIRPLANE CORPORATION
FAIRCHILD
Aircraft Division
HAGERSTOWN, MARYLAND

LOS ANGELES AIRWAYS

(Continued from page 38)

are LAA's equipment needs for the immediate and near future?

As flown on LAA, the average fuel consumption of the S-55 is 45 gallons per hour at an approximate average speed of 80 mph. The average altitude is approximately 1,500 feet.

At the present time, approximately 80 per cent of all passengers using our service are making connections to or from other air carriers. Of these, the preponderance of the passengers are businessmen, who are always the first to demand and use any new, convenient, safe and faster means of transportation that, in the long run, not only does not cost them, but actually saves them money.

As most of the passengers traveling on LAA are inter-line connecting passengers, our peak-hours are approximately the same as for the fixed-wing carriers. That is, our passenger demands are the greatest, both inbound and outbound, in the early morning and early evening; with the passenger demands being moderate to heavy during the mid-day—dependent upon other airlines' connections as well as other local factors.

With no prior concept of helicopter fare structures to guide us, our first fares were set up on the "zone" principle and were set at a rate determined to be competitive with other local forms of transportation. For example, the fare between the L. A. International Airport and cities in the "local" zone was $3.85, including tax; $6.00, including tax, in the first zone; $7.00, including tax, in the second zone; and $8.00, including tax, in the 3rd zone.

The theory that the public will buy your product, if you demonstrate that it serves their purpose, applies equally well to helicopter passenger flights. Here, fare, convenience and service are the prime prerequisites. Not only were the fares originally set up to be competitive with other local means of transportation, but by our providing a service so attractive and so indispensable, the primary air carriers found it good business to establish joint fares with LAA in exchange for the additional and new business we would be developing for them. Only $2 is added to a transcontinental airline ticket for the connecting helicopter ticket and direct at-the-gate connecting service.

Also, it was our thought, that in bringing the airport right to the door of 50 communities, within a hundred miles of the airport, our traffic density would provide constant load factors in the 80 per cent category. Of course,

(Continued on page 70)

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U. S. Navy

Simulator for the
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Air France

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1649 SUPER CONSTELLATION

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Simulators for the BOEING B-52, B-52C,
and B-52D STRATOFORTRESSES

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DOUGLAS C-118 TRANSPORT

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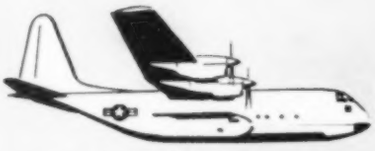

U. S. Air Force
Simulators for the LOCKHEED C-130 TURBOPROP TRANSPORT

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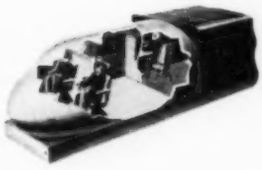
Simulator for the CONVAIR C-131 FLYING SAMARITAN TRANSPORT

For safety and cost reduction in commercial and military aircraft operation



Electronic Simulators, built by Curtiss-Wright, save millions of dollars, thousands of man-hours.

One of the greatest single factors in improving safety, and at the same time saving literally millions of airline and military dollars, is the growing worldwide acceptance and demand for Electronic Flight Simulators developed by Curtiss-Wright. It costs approximately $400 to keep a four-engine aircraft aloft for an hour. But for less than $30 per hour, pilots and crews can "fly" the Electronic Simulator built by Curtiss-Wright—gaining experience identical to actual flight — without ever leaving the ground — releasing multi-million dollar equipment for earning, not learning. U.S. Air Force studies show that at a single training base, over $4,000,000 per year is saved by Simulators.

A Simulator is constructed around the actual crew compartment of the aircraft it represents, complete with all instruments and controls. The physical resemblance stops here . . . but not the realism. The Simulator — a complex arrangement of analog computers that actuate, through servomechanisms, all controls and instruments — faithfully reproduces the flight characteristics, the engine and aircraft sounds of the prototype. For all practical purposes the pilot is flying. The feel of flying is in the response of his controls. His instruments are in action. A "trouble" console can present him with problems he might not encounter in months of actual experience — ice, snow, sleet, malfunction of equipment, turbulence. Varying sounds warn him of trouble. Red lights tell him of danger.

And to familiarize crews with the weather, geography, seasons which they will later experience, the Simulator can reproduce any route in the world, all navigational problems, complete to such things as radio static — at the flick of a switch.

So effective is flight simulation, and so vital to the economics of crew familiarization, that the Air Force has specified Simulators for every operational aircraft type scheduled for production. Curtiss-Wright now has sixteen military and six commercial Simulator types in production and service. Major world airlines, as well as the military, have ordered and reordered Simulators — the most effective and economical means of developing skilled crews.

Only through electronics is such flight reproduction possible. Only Curtiss-Wright, with basic patent rights in this field, and its licensees, build Simulators, and Duplicators, for both the Armed Services and commercial airlines of the world.

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First photo of Beech T-34B Mentors in Navy training shows four of the 170-mph., 225-hp. 2,900-lb. trainers in formation near Pensacola, Florida. They began replacing heavier obsolete, war-surplus SNJ trainers last month. —(Navy Photo.)

New For The Navy

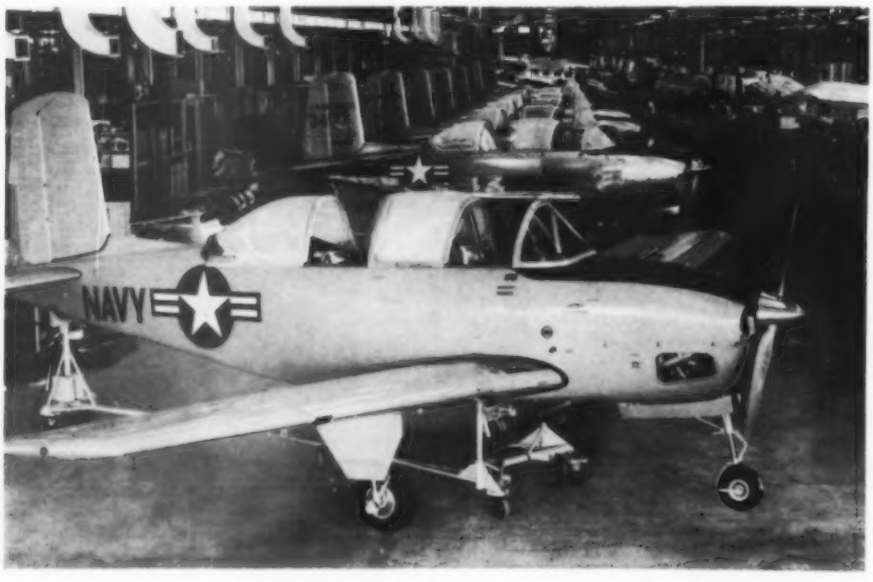
Tricycle training is made a reality by the Navy's switch to the Mentor

By JIM GREENWOOD

THE United States Navy last month launched a new pilot training program tailored to the rapidly changing needs of fleet air operations. Termed "Tricycle Training," it incorporates modern trainers equipped with tricycle landing gear in both basic and advanced courses of the Navy's flight curriculum.

From now on future naval aviators will start their flying careers in 225-hp. Beechcraft T-34B trainers, Navy counterpart of the Air Force T-34A Mentor, which replaces the venerable North American SNJ (USAF T-6) Texan in the primary phase of Naval Air Basic Training. Heretofore, cadets first sampled flying in the 600-hp. SNJ.

Use of the T-34 is expected to lower over-all training costs, reduce eliminations, and reflect in better flying safety. Students can solo the T-34 in half the time required for the SNJ. Moreover, advent of the Mentor is a big morale factor, in that the new trainer inspires confidence in the student and provides him with a feeling of flying a modern plane which conforms to more advanced types of military aircraft. The Navy anticipates the switch to the T-34 to be of about the same magnitude and nature as the conver-



Production line at Beech Aircraft Corporation in Wichita is turning out Mentor trainers for Navy and Air Force and for foreign countries wh'ch have also adopted it. It has cut pre-solo flight time in half for the Navy. —(Beech Photo.)

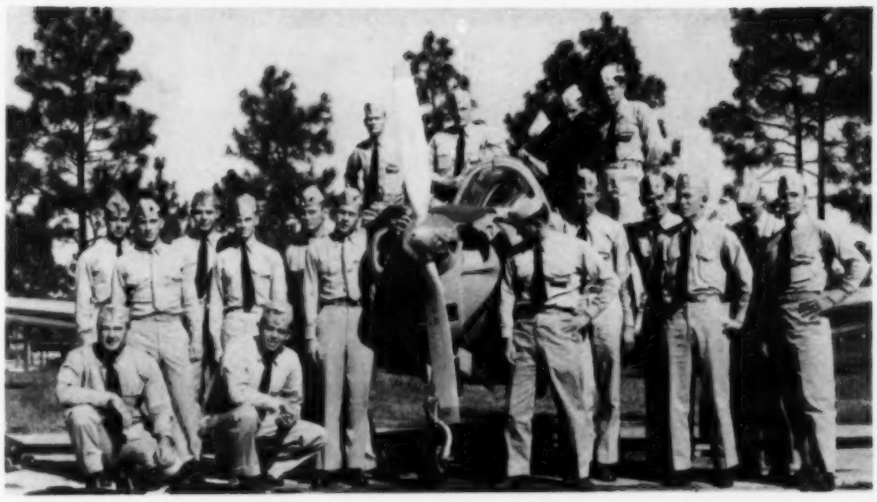
sion from N3N and N2S biplanes to the all-metal, low-wing SNJ monoplanes shortly after World War II.

Actually, the Navy's revised flight syllabus is similar in concept to recent changes in USAF pilot training. The Air Force in May, 1954, commenced phasing out all T-6 trainers in favor of the T-34A and the North American T-28A. The new planes are now operated at six of the nine USAF contract primary flying schools, and soon will be implemented at the other bases.

The new Navy program got under way November 2 at Pensacola, Florida — the Navy's "Annapolis of the Air." Appropriate ceremonies, held at nearby Whiting Field, an auxiliary air station, formally sent the first T-34 on its initial mission and, at the same time, officially integrated the Navy's newest propeller-driven trainer into pilot training. On hand were military and civilian dignitaries, including Captain J. P. Monroe, chief of the Naval Air Basic Training Command; Mrs. O. A. Beech, president of Beech Aircraft Corporation, which builds the T-34; Captain J. J. Lynch, Whiting Field commanding officer, and Frank E. Hedrick, Beech vice president-coordinator.

A hint of things to come was offered by Captain Monroe, who told observers that jets may be introduced in basic training by late 1957, adding that eventually fledgling pilots might even get their first taste of flying in jet-powered aircraft. He also paid tribute to the SNJ, which will go down in aviation history as one of the most versatile planes of all time.

Climax of the change-over ceremonies came when the captain's wife, Mrs. J. P. Monroe, cut a ribbon that released one of the bright yellow T-34's for use in Navy pilot training. Actual training in the T-34 started a day earlier, however, with 19 students beginning "A" stage. A second squadron was formed a few weeks later, and additional squadrons will form commensurate with production schedules until the last SNJ is finally retired from training service.



First Navy class in the new T-34B Mentor is pictured above at Whiting Field, a Pensacola Naval Air Station auxiliary. From the Beech, they will advance to the North American T-28B, powered by a 1,425-hp. Wright R-1820, and then to the brilliant new Lockheed T2V jet (below), which features boundary-layer control for improved handling at slow speeds.
—(Navy Photo Above, Lockheed Photo Below.)

To meet existing requirements and properly prepare nautical airmen for the supersonic planes of tomorrow, the Navy a few years ago laid plans to phase out all obsolete trainers and replace them with new equipment. Months of study, research and evaluation went into a projected pilot training apparatus geared to the technological advancements in naval air warfare.

Before instituting refinements in basic training, the Navy adapted the Lockheed TV jet trainer, the Navy equivalent of the USAF T-33, and the North American T-28B to a revised advanced training program. The Navy T-28 differs from the Air Force model in that it is powered by a 1,425-hp. Wright R-1820 engine, mounting a three-bladed propeller, which gives it

(Continued on page 66)

Ceremonies at Whiting Field formally inaugurating new Navy training program featured praise of the modern equipment by Captain J. P. Monroe, chief of Naval air basic training. Others in front row included (left to right) Mrs. Monroe; Capt. J. J. Lynch, Whiting Field commanding officer; Mrs. O. A. Beech, the manufacturer, and Frank Hedrick, Beech vice president.
—(Navy Photo.)

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Cessna aircraft owners fly more hours per month and cover more miles of territory per hour than ever before — because their Cessnas were designed for service efficiency in the air and on the ground.

Business fliers stay on the go more by depending on our Authorized Cessna Service to keep their aircraft always ready for reliability, performance and comfort. We know their needs best because our factory-approved facilities and staffs specialize in factory methods, equipment and accessories.

Get the most out of your Cessna by taking advantage of the three important service features guaranteed by our factory-supervised Cessna Flat Rate Program:

1. You get an accurately quoted price and time-required quotation based on hundreds of job studies covering virtually all maintenance needs.

2. You get genuine Cessna parts and factory-trained workmanship.

3. You save money and time and we stand behind every job for your fullest satisfaction.

To make the most of your Cessna's usefulness, visit the Authorized Cessna Service Stations listed below.

These progressive Cessna Authorized Service Shops offer flat-rate service.

Aircraft Sales Company
Meacham Field
Fort Worth, Texas

Champ's Aviation, Inc.
Municipal Airport
El Paso and Lubbock, Texas

Clinton Aviation Company
Stapleton Airfield
Denver, Colorado

Cruse Aviation, Inc.
Municipal Airport
Houston, Texas

Dal-Tex Aviation, Inc.
Highland Park Airport and Love Field
Dallas, Texas

Hair Flying Service
Harding Field
Baton Rouge, Louisiana

Howard Aero Service, Inc.
San Antonio International Airport
San Antonio, Texas

Poelman Aircraft Co.
New Orleans Airport
New Orleans, Louisiana

Ragsdale Flying Service
Municipal Airport
Austin, Texas

Kenneth Starnes Aviation Service
Adams Field; Little Rock, Arkansas

Southwestern Skyways, Inc.
Municipal Airport
Santa Fe, New Mexico
and Ogden, Utah

Sunny South Aircraft Service, Inc.
Broward International Airport
Fort Lauderdale, Florida

Walston Aviation, Inc.
Civic Municipal Airport
East Alton, Illinois

Yingling Aircraft, Inc.
Municipal Airport
Wichita, Kansas

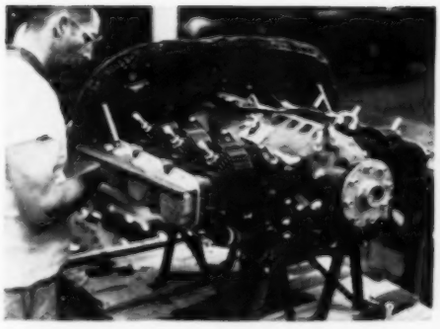
The New '56 all-metal Cessna 170

MORE FOR YOUR MONEY...NEW BEAUTY...NEW COMFORT...NEW QUIETNESS

Again in '56—you get more for your money in the new Cessna 170! More than 100 extra-value features you won't find on any other low-priced airplane. Dependable, proved performance, smoother operation, greater comfort and safety. Easily adaptable for floats and skis. Yet this all-metal, 6-cylinder airplane sells at the same low price of only $8,295, f. o. b. Wichita.

10 sq. ft. flaps

Big, wide "Paralift" flaps on the Cessna 170 are easily operated through 4 positions, give the Cessna 170 the shortest landings, quickest take-offs in the low-priced field.



Smooth 6-cylinder power...with new low sound level

The Cessna 170 offers you a dependable, powerful 6-cylinder, 145 H. P. engine! So smooth, quiet, vibration-free that a child can sleep peacefully on its comfortable foam rubber seats. Spacious interiors plus striking color schemes contribute to the extra comfort of the new Cessna 170.

See the '56 Cessna 170 at your Cessna dealer now (he's listed in the yellow pages of your phone book) or write CESSNA AIRCRAFT CO., DEPT. FM-1, WICHITA, KANS.

4 GREAT CESSNAS
THE COMPLETE AIR FLEET
FOR EVERY BUSINESS NEED

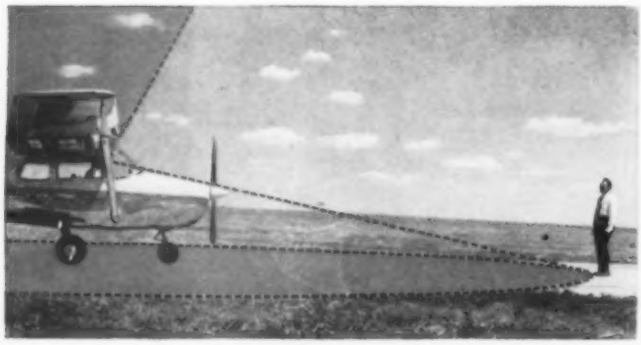
Cessna 170 172 180 310

Cessna announces a new..

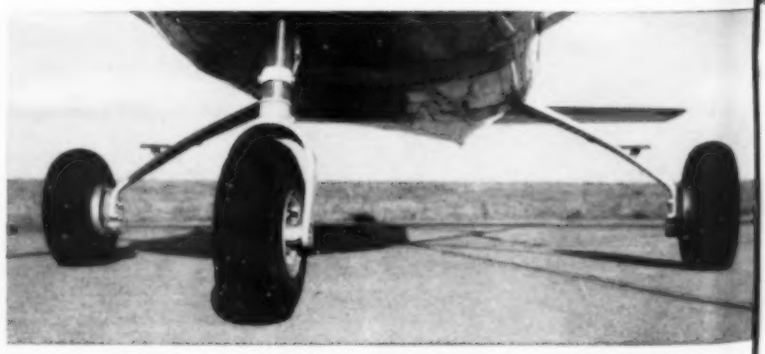
The Cessna 172—so completely new

The most exciting airplane in many a year . . . so completely different in landing, taxiing, take-off characteristics, it makes flying like driving! You actually "drive" the new Cessna 172 . . . out to the runway . . . into the air . . . back down to the ground!

Wonderful new steerability! You can turn and park the Cessna 172 easier than your automobile! Patented, wide-span, *Land-O-Matic* gear—a lower center of gravity—combines with such Cessna features as extra-big Paralift-Flaps, large tail giving greater stability and Cessna High-Wing design to make all this possible. Dependable, 6-cylinder Continental 145 H.P. engine. Striking new interiors make the all-metal, 4-place Cessna 172 tops in luxury and comfort. Ask your Cessna dealer to demonstrate it TODAY . . . (only $8,750 f.o.b. Wichita). He's listed in the Yellow Pages of phone book or write CESSNA AIRCRAFT CO., DEPT. FM-2, WICHITA, KANSAS.

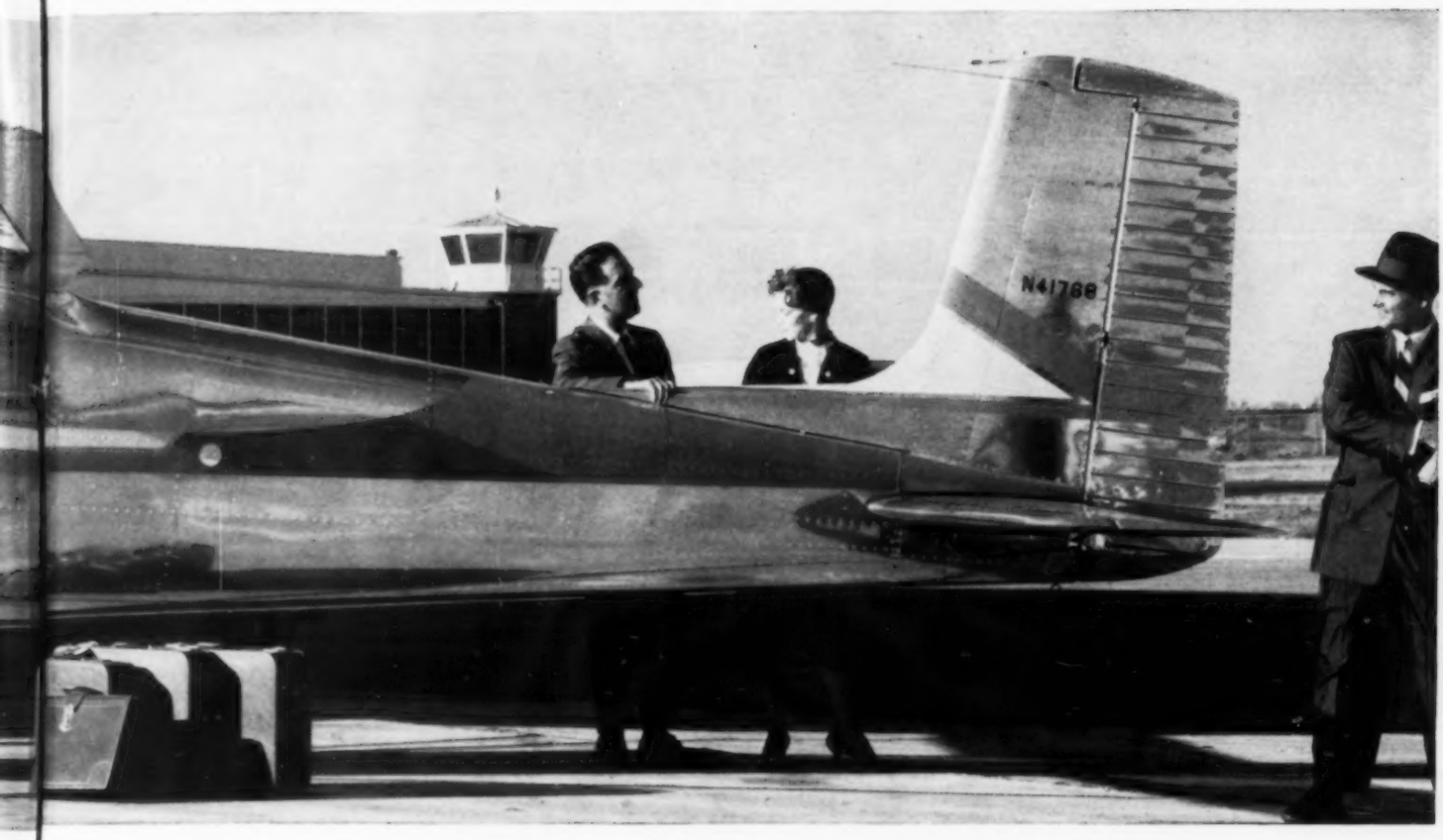


GREATER VISIBILITY: The all-new Cessna 172's level attitude, plus its extra-big, wrap-around windshield, provides the best visibility in the low-priced field. You can taxi with ease.



RUGGED, WIDE-SPAN, LAND-O-MATIC GEAR absorbs shock, allows smooth, safe landings, prevents nosing over. In the air, the nose wheel does not turn when rudders are activated. This cuts drag, increases speed. Lets you freely land and taxi cross-wind.

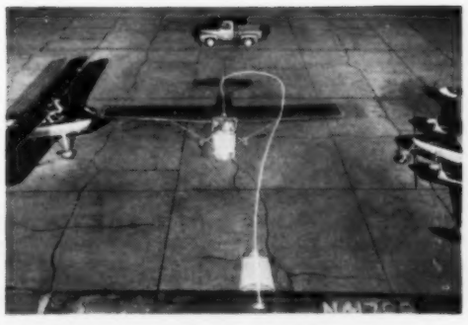
safer . . . easy-to-fly airplane



it makes flying like driving!

TAKE-OFF: The patented, wide-span, *Land-O-Matic* gear lets you lift nose wheel above mud or obstacles almost immediately after applying power. As a result, there is less ground drag, short take-off run.

LANDING: The new Cessna 172 lets you relax . . . virtually lands itself. Wide, spring steel main gear, strong, shock-absorbing nose support and low center of gravity make landings easy, smooth. Holds straight heading.



GROUND HANDLING: Cessna 172's individual toe-operated brakes combine with the steerable nose wheel to give you more complete control. Using either brake, you can make a complete turn—even in high winds—in a few feet.

Inquire about Cessna Lease Plans

4 GREAT CESSNAS—THE COMPLETE AIR FLEET FOR EVERY BUSINESS NEED

Cessna® 170 172 180 310

Piper Apache for 1956 is available with optional 5-place seating and optional 108-gal. fuel supply for greater utility. To seat five, the standard 2-place rear seat is replaced by two individual seats with a third individual seat behind them and occupying half the baggage compartment. Apaches are available in three versions, beginning with the $34,000 standard model. The price is up $1,500 over last year's. Piper has delivered over 350 Apaches. —(Piper Photo.)

New Piper Models for 1956

Improvements add utility to Apache Twin and Tri-Pacer as sales boom

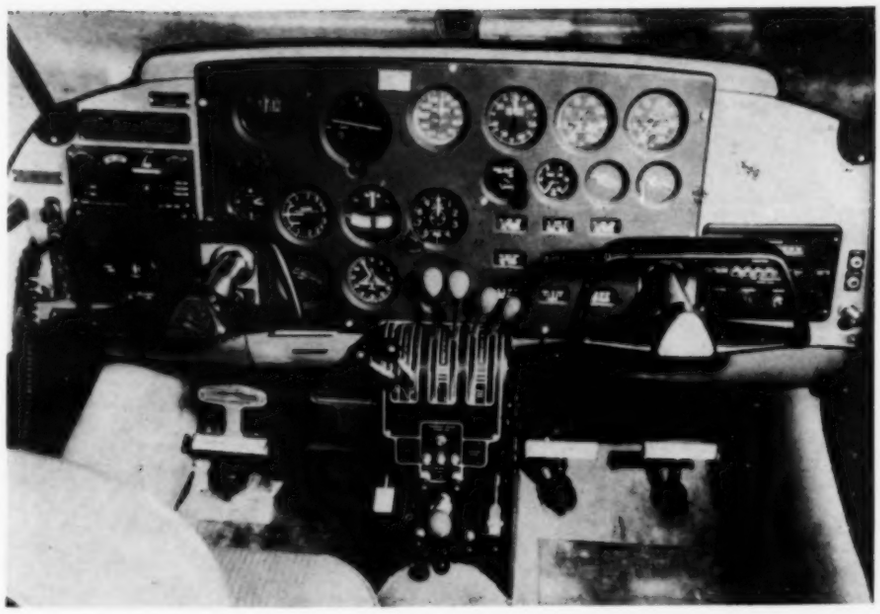
Five-seat configuration for the Apache is shown in this photo made outside of the airplane. Three rear seats are track-mounted. Seat behind pilot is moved forward to allow entry to aft seat.

OPTIONAL 5-place seating and extra fuel tanks for 1,200-mile range feature Piper Aircraft Corporation's 1956 versions of the popular Apache, the 170-mph. light twin powered by two 150-hp. Lycoming engines.

Piper introduced the improvements last month at its annual sales meeting in Lock Haven, Pennsylvania, where the firm's distributors also learned details of Piper's 1956 models of the 4-place, 150-hp. single-engine Tri-Pacer and the 2-place tandem Super Cub, available with either 90-hp. Continental or 150-hp. Lycoming engine.

Piper prices are up for 1956, being $575 higher for the Super Cub, $550 higher for the Tri-Pacer, and $1,500 higher for the Apache.

The Piper sales organization expects continued record business for 1956 after doubling its commercial sales in 1955, with dollar volume of factory billings skyrocketing from a little over $8,000,000 for 1954 to about $16,000,000 for 1955. A 50% increase is expected for 1956. Orders on hand cover production well into April, 1956, and twin-engine Apache production at a rate of two airplanes a day is being provided by a new 60,000-sq. ft.



Here's the compact Piper Apache instrument panel with control pedestal at its center grouping throttle, propeller and mixture controls. Engine instruments are at right, with flight instruments at left, while radios are located on each side of the instrument grouping.
—(Piper Photo.)

assembly addition to the over-crowded factory. Apache No. 350 has been delivered.

Five-place seating in the Apache, smallest of the business-flying twins, has been made possible by the installation of tracks to accommodate three individual sliding seats behind the two front seats. The extra seat, or fifth one, fits in the left portion of the aft cabin and baggage compartment but still leaves 12.5 cu. ft. of space for baggage. To use it, the hat shelf is removed and this makes the baggage compartment an integral part of the cabin. It is upholstered to match the rest of the cabin and the hat shelf removal makes available an unobstructed floor space 108¾ inches long to accommodate the five individual seats.

Access to the fifth seat is accomplished by staggering the two middle seats on their tracks. This creates an aisle between them through which the fifth seat occupant moves.

A second optional seating arrangement provides two extra-plush reclining airline-type individual seats mounted on tracks. One or both can be moved well aft, with the hat shelf out, to permit a full reclining position and more than ample leg room for sleeping.

These two optional seating arrangements will not become available until February 1, 1956. The standard seating arrangement in the Apache is for four persons, two in front and two on a rear seat. The rear seat can be easily removed in less than 2 minutes without tools.

Optional increased fuel capacity is available for an economy range of up to 1200 miles as compared to the standard Apache economy range of up to 840 miles. This is provided by installation of two 18-gal. fuel cells outboard from the regular 36-gal. fuel cells in each wing. The four tanks offer a total capacity of 108 gals. The fuel tank selector valve between the front seats automatically changes the

The popular 4-place, 150-hp. Piper Tri-Pacer has been made more comfortable with adjustable front seats, more leg room with rudder pedals moved forward and with improved soundproofing. Tri-Pacer prices start at $7,295, up $550 from last year.
—(Piper Photo.)

The familiar 2-place, tandem Piper Super Cub is available for 1956 with either 90-hp. Continental engine or 150-hp. Lycoming engine and is priced at $4,795 for the former and $5,995 for the latter. —(Piper Photo.)

function of the two fuel gauges on the panel to show the contents of a specific tank. Factory figures are 18.8 gals. per hour fuel consumption for 170-mph. and 13.8 gph. for 55% power at 148-mph.

Performance and specification details are given in the accompanying table. Empty weight is increased 30 lbs. by the optional seating and 20 lbs. by the extra fuel tanks.

Three models of the Apache are offered in the 1956 line. They are the Standard at $34,000, the Custom at $36,790 and the Super Custom at $38,310. The Custom includes Narco Omnigator with 8-channel transmitter, omni navigation system, ILS localizer receiver, 75-mc marker beacon receiver, tunable VHF transmitter, Narco VC-27 VHF receiver with 27-channel VHF transmitter having 25 crystals included and Lear ADF-12 ADF with LF receiver. The Super Custom includes dual 35-amp generators, dual vacuum pumps, 108-gal. fuel capacity and heated pitot tube.

Lycoming 0-320 four-cylinder engines of 150-hp. each power the Apache, with full-feathering, constant-speed Hartzell propellers.

Distinctive new interior and exterior styling for the 1956 Apache includes Daytona white wings, horizontal tail surfaces and trim, with an option of Key West blue or Cadillac red for the fuselage and other trim. Interior two-tone combinations match the exterior. Upholstery and cabin side walls are done in black with silver trim and either blue or red matching colors. The instrument panel is non-glare black.

Apache landing gear and flaps are hydraulically operated by an engine-driven pump and an auxiliary hand pump. A third gear extension system for emergency consists of a CO-2 system actuated by pulling a ring under the left pilot's seat. This extends the landing gear even if all hydraulic fluid is lost.

The all-metal Apache has welded steel tube frame around the cabin with aluminum skin. The wing has a massive single spar joined under the front pilot seats.

Tri-Pacer More Comfortable

For its 1956 version of the Tri-Pacer, America's largest selling 4-place model, Piper has made the cabin more comfortable by (a) moving the rudder pedals forward several inches for more leg room, (b) individual front seats with 5-inch fore-and-aft travel and (c) reduced cabin noise level with improved soundproofing and door seals.

More ideal instrument grouping has

New instrument panel for the Tri-Pacer is shown here, with the pretty girl showing the hand lever for the brakes. The new panel groups flight instruments on the left, radios in the center and engine instruments on the right. —(Piper Photo.)

more performance in reserve

...than any other executive airliner

Learstar

LEAR, INCORPORATED, AIRCRAFT ENGINEERING DIVISION, SANTA MONICA, CALIFORNIA • THE LEARSTAR IS A MODIFICATION OF THE FAMOUS LOCKHEED LODESTAR

been accomplished with a revised instrument panel in the Super Custom model. Radio equipment is moved to the center of the panel in recognition of the fact that radio has become primary equipment in recent years, especially for navigation. This transfer also allows Piper to centralize flight instruments on the left directly in front of the pilot. In the Super Custom Tri-Pacer, which is most generally ordered, the left side of the panel groups directional gyro, artificial horizon, air speed, clock, sensitive altimeter, turn and bank and rate of climb. The right panel groups engine, fuel and electric instruments. The flat deck between the top of the panel and the windshield this year has a removable hatch to permit easy access to the back side of the instruments. A pilot's check-off list has been added.

New exterior paint design for the Tri-Pacer is available in two color combinations as standard, these being Cadillac red fuselage and Daytona white wings or Key West blue and Daytona white.

Two-tone interiors are available in two combinations matching the exterior. Seats are in black worsted with red or blue plastic upholstery fabric and the same color combinations for the side walls. Headlining is gray. The panel is in non-glare black and the deck above the panel is upholstered with black stitched nylon material for soundproofing and glare elimination.

Performance and specifications are given in the accompanying table for the Tri-Pacer, which is offered in three 1956 versions. The Standard with basic flight instruments is priced at $7,295. The Custom, at $7,895, has Narco VTLR, VHF transmitter and LF receiver, sensitive altimeter, strut fairings, navigation lights and other extras. The $8,895 Super Custom has the following in its standard equipment: Narco Superhomer, a combination 4-channel VHF transmitter with 3 crystals, tunable VHF receiver covering 108 to 127 mc and omni navigation system; Narco LFR-1 low-frequency receiver with separate power supply; fixed-loop built into the aft end of the fuselage to permit homing on LF and broadcast stations; full panel of gyro and other instruments; landing lights, navigation lights and other accessories. All three models have starter and generator. Autopilot, floats and other equipment are available.

Sales Meeting Notes

The 1955 distributors' meeting at the Piper factory was the largest and most prosperous ever conducted. Sales Manager Jake Miller said new plane sales by distributors had skyrocketed from $4,300,000 for 1950 to $20,500,000 for 1955 in retail billings and announced that the quota for 1956 sales is $30,000,000 in retail billings.

Some 350 Apaches have been delivered by Piper and completion of a 60,000-sq. ft. addition to the factory will boost production of the light twin to 2 airplanes a day next year.

Top domestic Piper distributor in new plane sales for 1955 was revealed to be John Baker, Baker Aircraft Sales, Long Beach, California. He sold 155 Pipers, 32 of which were Apaches. Jonas Aircraft & Arms Company of New York, international distributor for Piper, topped Baker's sales by delivering a total of 198 new Pipers during the year for overseas destinations. These included numerous Apaches flown across the Atlantic.

Top Piper Quota-Busters — distributors whose sales exceeded their quotas — were B. F. Hines of Hobbs, New Mexico, and Roy Neal of Lubbock, Texas, who led the entire Piper organization.

The sales meeting was conducted in the form of a stage production arranged and maintained at a fast pace by Sales Manager Miller and his assistant, Wally Smith. One of the features was the showing of two new 27-minute sales movies. One of these pictured the recent Apache flight across the South Atlantic to Africa by the Piper brothers and the other was devoted to a tour of the Piper factory. Both are available to distributors for public showings.

Sales Manager Miller also revealed he has completed a new series of television commercials in answer to a growing demand.

Comanche to Fly Soon

A highlight of the sales meeting was the revelation of first sketches of the new Piper Comanche, a 4-place all-metal, low-wing with retractable tricycle gear which is being developed at the factory (see page 17 for sketches). No details were divulged but it was said that the Comanche will be in the medium price bracket and offer high performance. Piper officials emphasized that the Comanche is still a long way from being on the market as the first delivery is not scheduled until some time in 1957. It is too early to decide on a firm price, for example, they pointed out. However, the prototype will fly this winter and a spokesman said tooling for the Comanche's production is being built while the prototype is under construction, so that production facilities will be in readiness when flight tests and CAA certification are completed. ★ ★ ★

1956 Piper Apache

Factory Performance and Specifications

The Apache is a low-wing, all-metal, 4-place airplane with retractable tricycle landing gear and powered by two 4-cylinder Lycoming model O-320 engines rated at 150 hp. at 2,700 rpm. driving Hartzell metal, full-feathering, constant-speed propellers. The 1956 model is available in three versions priced at $34,000 for the Standard, $36,790 for the Custom and $38,310 for the Super Custom. Five-place seating is optional at extra cost.

Gr. Wt., lbs.	3,500
Empty Wt., lbs.	2,180
Useful Ld., lbs.	1,320
Top Spd., mph.	180
Cr. Spd. (75% hp., 6,000 ft.), mph.	170
Stall Spd., (gear, flaps down, zero thrust), mph.	52
Fuel Cap., gals.	72
Cr. Range (75% hp., 6,000 ft.), mi.	660
Cr. Range (55% hp.), mi.	840
Fuel Cap., Optional Tanks, gals.	108
Cr. Range, Ec. Pow., 108-gal. Cap., mi.	1,260
Take-Off Run, ft.	900
Landing Roll, ft.	670
Rate of Climb, fpm.	1,350
SE Rate of Climb, fpm.	240
Abs. Clng., ft.	20,000
SE Clng., ft.	6,750
Bag. Cap., lbs.	200
Bag. Space, cu. ft.	25
Cargo Sp. (rear seat out), cu. ft.	80
Span, ft.	37
Length, ft.	27.1
Height, ft.	9.5
Wing Area, sq. ft.	204
Wing Ldg., lbs. per sq. ft.	17.2
Power Ldg., lbs. per hp.	11.6
Wheel Base, ft.	7.5
Wheel Tread, ft.	11.0

NOTES: Optional seats add 30 lbs. to empty weight. Optional fuel tanks add 20 lbs. to empty weight. Performance and specifications are for a standard aircraft flown under CAA standard conditions. All performance is for gross weight at sea level unless otherwise noted.

1956 Piper Tri-Pacer

Factory Performance and Specifications

The Apache is a high-wing, 4-place, fixed-tricycle-gear airplane powered by a 4-cylinder Lycoming Model O-320 engine rated at 150 hp. at 2,700 rpm. driving an all-metal Sensenich propeller. It is available in three 1956 versions, the Standard at $7,295, the Custom at $7,895 and the Super Custom at $8,895.

Gr. Wt., lbs.	2,000
Empty Wt., lbs.	1,100
Useful Ld., lbs.	900
Top Spd., mph.	139
Cr. Spd. (75% hp., SL), mph	123
Cr. Spd. (75% hp., 7,000 ft.), mph.	132
Stall Spd. (flaps down), mph.	49
Rate of Climb, fpm.	724
Svc. Clng., ft.	15,000
Fuel Cap., gals.	36
Range, miles	550
Bag. Cap., lbs.	100
Span, ft.	29.3
Length, ft.	20.6
Height, ft.	8.33
Wing Area, sq. ft.	147.5
Wing Lndg., lbs. sq. ft.	13.5
Pow. Ldng., lbs. per hp.	13.3

NOTES: Performance figures are for a standard airplane flown at gross weight under CAA standard conditions at sea level.

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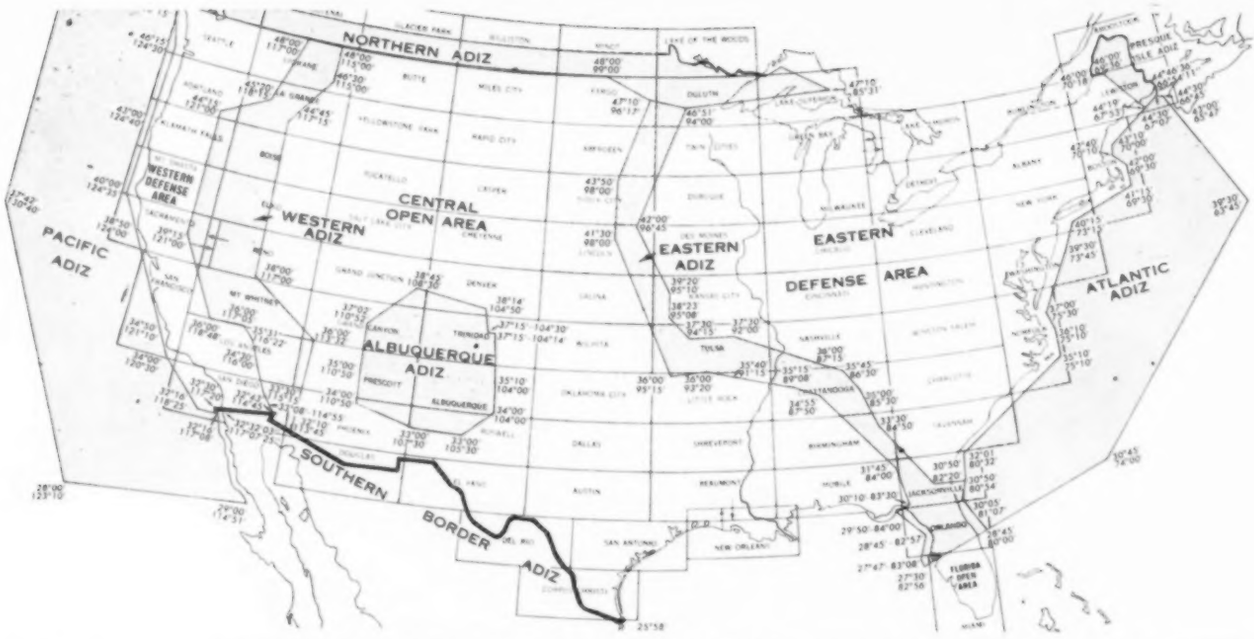
Gray Aircraft Service Co., Inc.

LOVE FIELD DALLAS



Here is the new arrangement of air defense identification zones (ADIZ) and defense areas as designated by the Civil Aeronautics Administration and which became effective on December 1.

New ADIZ Requirements

NEW arrangement of air defense identification zones (ADIZ), defense areas and open areas became effective on December 1 and is shown above as designated by the Civil Aeronautics Administration. The CAA has also revised the security rules (Regulations of the Administrator, Part 620). The new arrangement is published in the new Airmen's Guide and should be studied by all pilots.

What all this means is that pilots have new requirements to comply with, or face violations and risks of being intercepted in flight by military aircraft which not only seek to establish identification but are apt to create hazards for themselves and civilian aircraft in the process.

The military has recently been bearing down on ADIZ requirements, even before the change in zone arrangements, and there have been numerous cases of civilian pilots being cited for failure to adhere to ADIZ requirements. There have also been frequent intercepts by military aircraft. To avoid even more such complications, civilian pilots will have to study the new requirements to make certain they can be met at all times.

The military and the CAA may refer to the set-up as being "simple" and "easily understood," but try your hand at interpreting the following text from CAA and see for yourself:

The Air Defense Identification Zones of the U. S. are radically revised as indicated on the map. The Security Rules, (Regulations of the Administrator, Part 620) are also significantly changed. Generally, the sizes of the Zones are reduced. The Zones are removed from high-density air traffic areas and extended outward around important areas, thereby increasing perimeter defense capabilities. The former 4,000-foot exemption in the Continental U. S. is eliminated.

VFR Flights: A pilot on VFR flight within or entering an ADIZ must file a DVFR (Defense Visual Flight Rules) Flight Plan and must make a position report over a geographic fix prior to entering an ADIZ, including estimated time over the next reporting point along his flight path. If this position reporting is not practical, the pilot must report to an appropriate aeronautical facility at least 15 minutes in advance, the estimated time, position and altitude at which the aircraft will enter the ADIZ.

IFR Flights: Normal IFR procedures within controlled airspace will meet the requirements of Part 620. Outside of controlled airspace, an IFR Flight Plan and adherence to DVFR procedures will suffice.

Communication Equipment Required: Aircraft penetrating or operating within designated ADIZs must be equipped with two-way radio. (See paragraph 7 under "Exceptions.")

Adherence to Flight Plan Or Air Traffic Clearance: 1. IFR Flights Within Control Zones and Areas. No deviation shall be made unless an amended clearance is received from Air Traffic Control. 2. IFR Flights Outside of Control Zones and Areas, and all DVFR Flights. No deviation from flight plans as filed shall be made unless prior notification is given to an appropriate aeronautical facility.

Allowable Tolerances: Part 620 requires the navigation of aircraft within the following tolerances: 1. Five minutes error from an estimated time over a reporting point or point of penetration of an ADIZ; or, in the case of flights originating within an ADIZ, five minutes error from the proposed time of departure specified in the Flight Plan unless the actual time of departure is reported to the appropriate aeronautical facility. 2. Ten miles from the centerline of the route of flight if the flight is entering or operating within a domestic ADIZ; or 20 miles from the centerline of the route of flight if the flight is entering or operating within a coastal ADIZ. 3. A pilot of an aircraft on either DVFR or IFR flight plan for which air traffic clearance is not required should not deviate from the cruising altitude specified unless prior notification is given to an appropriate aeronautical facility, except that he may begin descent from the altitude specified in the flight plan within reasonable distance of destina-

(Continued on page 76)

Executive meeting "upstairs"

BEECHCRAFT SUPER 18

There's no time lost by the efficient executive team of the R. Company. Traveling by company plane to inspect a new plant site 400 miles away, they get there quickly and free of restricting schedules — and they get plenty of work done on the way.

When they set down at one of more than 600 Esso Dealer Airports, their pilot may use his Esso Aviation Credit Card to charge high-quality Esso Aviation fuels and lubricants, tire and battery service, landing fees, overnight storage and minor emergency repairs.

The growing corps of business flyers is learning to depend more and more on famous Esso Aviation Products — used by the world's largest airlines and backed by over 45 years of flight testing and research.

ESSO

AVIATION PRODUCTS

Supercharged Continental for Cessna

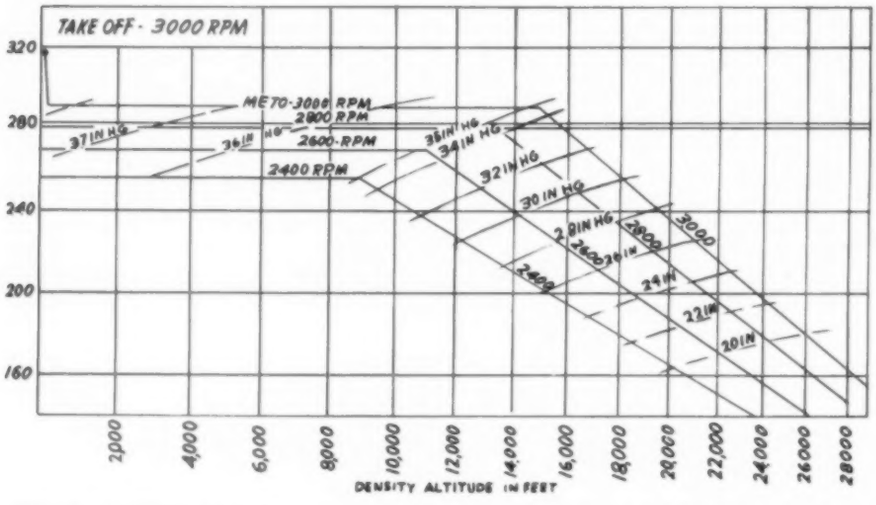
FIRST performance charts on the new 6-cylinder, supercharged Continental GSO-526-A, reproduced on this page as obtained from Continental Motors Corporation, show what can be expected from the new engine series developed for the new 4-engine Cessna Model 620 executive transport.

As rated for the high-flying Cessna, which will feature cabin pressurization, the GSO-526-A will furnish 320 hp. at 3,000 rpm. for take-off from sea level up to an altitude of 11,500 ft., and 290 hp. at 3,000 rpm. up to an altitude of 14,000 ft.

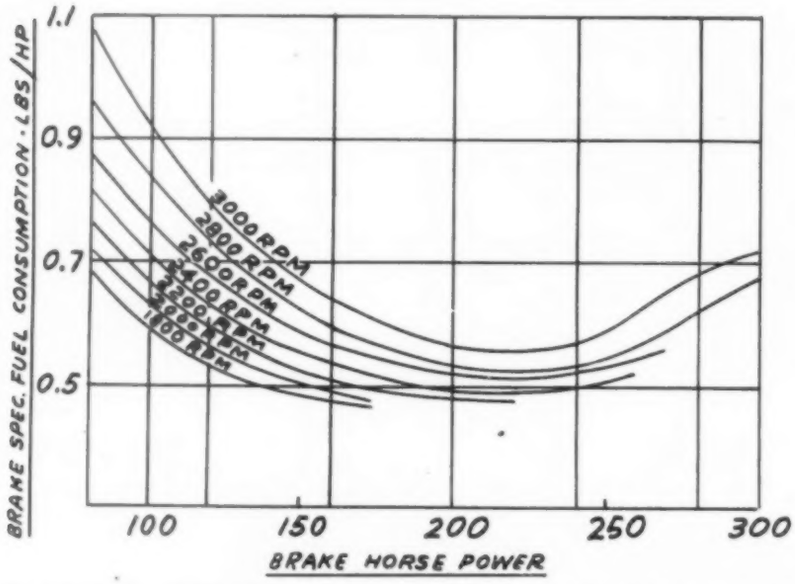
Economy cruise is pegged at 174 hp. at 2,400 rpm. for 60% of rated power and at this setting the GSO-526-A should burn approximately 13.9 gals. per hr. This is a general specification and will be bettered in actual flight at cruising altitude. Cessna says cruising speed will be 250 mph.

The GSO-526-A is a horizontally-opposed, geared-drive, overhead valve, wet-sump type of engine with down-directed cylinder exhaust outlets and featuring a gear-driven supercharger of 12 to 1 ratio at the rear of the accessory section. Piston displacement is 526 cu. ins., bore is 5.125 ins. and stroke 4.25 ins. Compression ratio is 6 to 1. Propeller gearing has a 1 to 0.688 ratio and the engine has a flanged propeller shaft. A Bendix-Stromberg PSH-7BD carburetor is used and has automatic mixture control for which the service ceiling is 24,000 ft. Oil capacity is 20 qts. with specific oil consumption of 0.22 lbs. per hp. hr. or less.

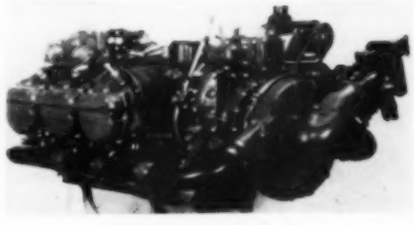
Basic engine dry weight is 539.3 lbs. With accessories, its weight is 578 lbs. ★ ★ ★

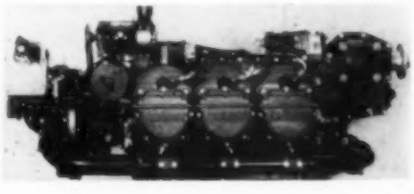


ALTITUDE PERFORMANCE of the new supercharged Continental GSO-526-A is shown in these curves, which do not take into consideration ram effect. Horsepower figures (left), crankshaft rpm., and manifold pressure are shown. These curves are for a propeller gear ratio of 0.688 to 1, compression ratio of 6 to 1, supercharger gear ratio of 12 to 1, 6.75-in. impeller diameter, a PSH-7BD carburetor, 91-octane fuel and standard air.



ESTIMATED BRAKE SPECIFIC FUEL CONSUMPTION AT CONSTANT RPM is charted above for the GSO-526-A. These curves are based on sea level performance.





These views of the GSO-526-A show supercharger at rear (above) and propeller gear section at nose (below). Atop the accessory pad is belt-driven generator. Engine dimensions are: Length, 52.28 ins.; width, 34.68 ins., and height, 23.96 ins.

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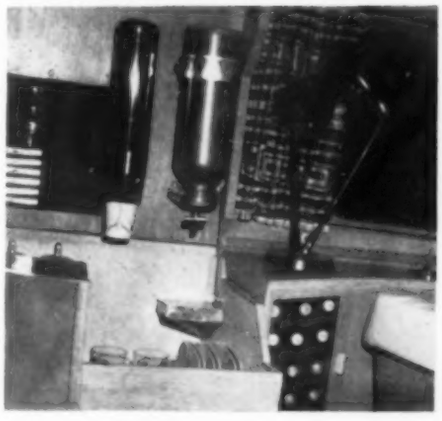

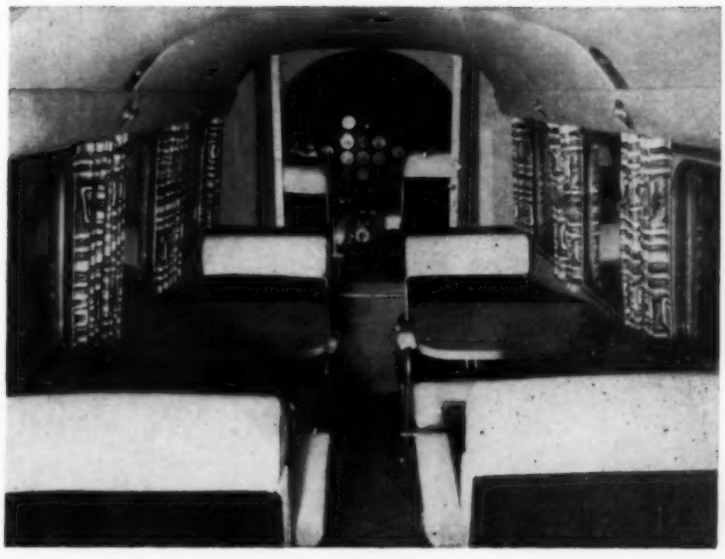

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HILLER HELICOPTERS

(Continued from page 37)

awarded their wings and the Dutch Army has begun to call on helicopters for practical missions.

Hiller is developing flying platforms for the Navy. These research machines use the ducted airfoil principle.

Of interest is the fact that the MDAP helicopter program for Holland came about as a direct result of enthusiasm generated in that country following heroic helicopter rescue work performed during the catastrophic flood in 1953, in which commercial Hiller aircraft from neighboring countries participated. Soon after, Aero Ypenburg of The Hague bought a 12-B as the country's first commercial machine, and its enterprising pilot, E. Schuller, further increased national awareness of helicopter potential with his many exploits.

In Indochina, helicopters sold by the Hiller Commercial Division were in combat service even before the Korean conflict began. Captain A. Santini, in charge of helicopter operations for the French Air Force, was one of the first military pilots to prove the possibilities of the helicopter in warfare. Dramatic rescues in dense jungles were made regularly, and morale of the French troops was raised significantly by use of the machines.

As a result of commercial Hiller aircraft in the Indochina war, an MDAP program was approved for the French Air Force, calling for a number of evacuation-type helicopters. Before they could be manufactured and delivered, however, the truce was signed and the aircraft were not needed.

Efforts to sell and service helicopters on an international basis have also necessitated much travelling by Hiller personnel. In addition to executives who regularly go to far points of the world on such missions, the company also sends technical representatives especially trained for the job.

George Pour, technical representative for Hiller helicopters for many years, recently returned from a four months trip around the world during which he visited numerous customers, potential customers, and distributors.

Most recent travelers to return to Palo Alto after an extensive trip throughout Europe were President Stanley Hiller, Jr., and Vice President A. J. M. Chadwick, whose itinerary throughout the continent was arranged by commercial sales distributors.

Improved Model 12-C

Since certification of the Hiller 360, Hiller Helicopters has constantly worked toward improvement of its aircraft and has offered several successive models. Immediately following the 360 came the Hiller 12-B, incorporating more power and other improvements, and at the present development the company is offering its newest model designated the Hiller 12-C.

Outstanding noticeable changes on the 12-C are the full bubble-type canopy to give improved visibility, a new rotor hub for improved flight characteristics, and a compact instrument panel two-thirds the size of the previous panel.

A number of other engineering improvements are also incorporated in the 12-C, all concerned with giving higher operational utility with lower maintenance costs.

An accessory recently developed which will be available for the 12-C is a supercharger which will increase altitude performance by approximately 5,000 feet. ★ ★ ★

Commercial certification of the small Hiller Hornet ram-jet helicopter is under way. However, no plans for its commercial sale have been made.

NEW FOR THE NAVY

(Continued from page 51)

a top speed of 346 mph., or about 60 miles an hour faster than its USAF counterpart. The USAF T-28A uses an 800-hp. Wright R-1300 powerplant.

More recently, the Navy accepted for its advanced course the 600-mph. Lockheed T2V, a modification of the TV and the first jet trainer designed specifically for carrier operations. The T2V features a boundary layer control system by which compressed air from the engine is channeled into the wings and squirted through tiny holes directed at the flaps and ailerons, causing normal airflow to hug the control surfaces. Another improvement is the installation of wing slats which extend along the length of the leading edge of each wing. The slats are actuated by air pressure alone. The combination of these unique devices greatly enhances lift, enabling the jet to fly at lower speeds without stalling.

In July, 1953, the Navy began rigorous service trials for a new primary trainer suited to its specialized needs. Then in June, 1954, it announced that the Beechcraft T-34B had won over all other designs, awarding Beech a contract for a substantial quantity of the new trainer. During evaluation drop tests, incidentally, the T-34B exceeded Navy load specifications by 74 per cent. The plane is also stressed for 10 positive and 4.5 negative "G" loads making it a rugged, worthy and welcome youngster to the Navy's long line of primary trainers.

The first production T-34B was delivered on schedule December 17, 1954, just six months to the day from receipt of the Navy's initial order. As additional planes were received, the Navy established a two-week primary instructor transition program involving about 17 hours of flying. Knowing that good airplane performance starts from the ground up, the Navy also sent two teams of aircraft technicians to the Beech factory for indoctrination training in T-34 construction and maintenance.

Subsequently, the Navy's Instructor Basic Training Unit (Flight) at Pensacola got the job of working out a new training syllabus for the T-34. Commander W. C. Bender, IBTU bossman, assigned Lieutenant C. L. (Chuck) Stiles as T-34B project officer. Stiles' group soon came up with a tentative syllabus and tried it on a small, test class of four student officers selected at random.

First trainees to solo the new plane were two Californians, Ensigns D. E. White of Los Angeles and L. S. Seiger

(Continued on page 75)

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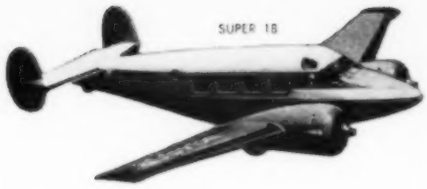

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3 When your Beechcraft requires the replacement of a part, you know the Beechcraft Certified Service Stations will use only factory-authorized parts. And more important, they will avoid the long delay that comes from not having the part in stock. Each of the Certified Service Stations maintains a complete stock of parts for your immediate needs.

4 The extensive maintenance facilities available to you at Certified Service Stations are equipped to serve every overhaul and maintenance requirement. Special tools are used for each job, all designed after long-specialized experience in every phase of service and maintenance. These special tools are important to you for they minimize the time required to perform each job.

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LOS ANGELES AIRWAYS

(Continued from page 46)

what we say here about passengers applies equally as well to air express and mail.

Secondly, within the hypothetical limitations of this 80 per cent load factor, we could begin to visualize a pattern for the practical size of our flying machines. This simply means that we should virtually fill the machine without having passengers wait for any appreciable length of time. Our experience is premised on making about a 15- to 30-minute connection to one or more (but, not to exceed four) carriers at a given period of time. It also means that we cannot make an indiscriminate number of landings, particularly on a passenger shuttle service. That is to say, we can't distribute one or two persons here or there along the line and expect to save them time and to provide the service which the helicopter passenger is led to believe he is getting for his money.

Experience in our operation has proven that the utility of the helicopter is compromised unless each community has its own site, located adjacent (and we mean right in the middle of things) to the source of the three basic elements of traffic. Of course, in larger communities this means a multiple-heliport pattern.

With this in mind, we run into a problem over which we have only a moderate amount of control; i.e., the availability of land area which can be made available on virtually a nominal basis and have the "built-in" features of safe and easy access from a navigational point of view, in addition to being situated so that it is easily accessible to the passenger.

Mail is carried in large amounts by Los Angeles Airways, world's first helicopter airline which began operations in 1947. —(Los Angeles Airways Photo.)

Currently, it is felt that the presently useful 200x200-foot square configuration, properly located, is adequate. We believe that more emphasis should be placed on the location than on the size; but, we also believe the two put together, in connection with a frequency factor of schedules, will be the prime determining elements in regard to the size of the helicopter, which could be popularized as the "work horse" of the foreseeable future.

Helicopter Requirements

In this regard, we depart completely from the school of those who believe the answer to our problems lies in designing bigger, noisier, and costlier helicopters (remember — we had big airplanes long before we had profitable ones). We are not entirely alone, though, when we say that if we could buy a machine with about 50 to 75 per cent more capacity than our present S-55's — we could then carry 12 passengers or more — at just a little lower cost; in our area, at least, there would exist no economic problem which could not be resolved in the public interest within the next five to ten years.

It is recognized that the future development of helicopter transportation depends greatly on the safety and economy that will be achieved. To this

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end, the manufacturers must provide a helicopter that can be operated safely from city-center heliports at a cost per ton-mile somewhere near that achieved on short-haul operations by present fixed-wing aircraft.

While it is true that Bell, Bristol, Hiller, McDonnell, Piasecki, Sikorsky and other manufacturers have larger and better helicopters on the drawing board, "in the mill" and in the air, still no one has come up yet with the helicopter that completely fills either the present-day or future commercial transportation needs.

While one might say that the scheduled helicopter services are still in a relatively early experimental stage, LAA has become one of the largest carriers of air mail in the world. LAA's metropolitan system of helicopter operations — passengers, mail and air express — is much larger and much more extensive than one might believe. The size of this operation, however, can be visualized when one realizes that Los Angeles Airways has ninety-six flights a day in and out of Los Angeles International Airport.

Metropolitan Helicopter Service

Our metropolitan system of helicopter operations itself has evolved from the transportation problem in the metropolitan areas — the need is for a short-haul scheduled airline service that can penetrate to the centers of our large metropolitan cities and link those centers with the outlying suburban communities. The helicopter is the only means of transportation which has proven itself capable of solving these transportation problems.

Let's use the example of greater Los Angeles metropolitan area. Its boundaries take in an area of approximately 1,200 square miles for a population of some 6 million. This is an area about the size of the state of Rhode Island.

The transportation problem of this tremendously far-flung area is for fast and efficient transportation from its central city center to the other city centers of the nearby and outlying suburban cities and towns such as Anaheim, Fullerton, Long Beach, Santa Ana, Pomona, Ontario, Riverside, San Bernardino, Pasadena, and the many others that comprise the 155 communities of this area and for fast and efficient transportation between various suburban city centers themselves and for fast and efficient transportation between the terminal airport, which serves the entire area, and the local and suburban heliports which

serve the communities and the people. The transportation problem of this specific area is further complicated by the fact that the greater Los Angeles metropolitan area includes many communities which are large cities in their own right, such as Beverly Hills, Hollywood, and many others.

Tie all of this in with a fast and efficient transportation system connecting various forms of transportation themselves — airlines, trains, busses, and ocean-going ships — we then have a comprehensive picture of what has developed into the "metropolitan system of helicopter operations."

In this activity, the first and most important function of the helicopter is connecting transportation — that is, air movement of passengers, mail and express between the many outlying cities and towns of a metropolitan area and the terminal airports for direct at-the-gate connections to and from all airline points in the world.

In the metropolitan area, it is the helicopter's function to complement, augment, and to help improve the other forms of transportation — by linking them together and by extending their service beyond their terminal points of departure and arrival through to the outlying communities. In short, while the helicopter is a specialty vehicle and most efficient on short-hauls, it makes it possible for the long-haul carriers to do their job right.

The metropolitan helicopter airline will ultimately become a service agency on a local level to all other forms of transportation converging in that area. For example, Los Angeles Airways is already linking about 35 cities in Southern California directly to airline trunk carriers at the Los Angeles International Airport. Including the other two scheduled helicopter airlines in the U. S. at Chicago and New York, this means that approximately one-fifth of the total population of the United States now has available better and faster transportation facilitiees by means of helicopter connections. This is an already accomplished fact and it has tremendous significance.

To give an idea of the potential of this helicopter airline "connecting service" in the Los Angeles area — in 1954, one million, four hundred thousand travelers departed from the Los Angeles International Airport. Of that number, being very conservative, at least a million were not located conveniently near the L.A. airport — within, say, a ten-mile radius — but came from the 155 outlying communities and cities such as Long Beach, San Bernardino, Anaheim, and the many others. This further means that the potential in 1954 for helicopter service to the L. A. Airport alone was about a million passengers — providing a complete and adequate helicopter service had been set up to serve these outlying points.

Future helicopter-airplane-helicopter service will allow a person in the Los Angeles area to mail a letter to New York and *get a reply back the same day*. And New York passengers can actually fly to Los Angeles and back the same day. While this concept may take years to reach its ultimate goal, it has already gotten underway.

The second function of the helicopter in the metropolitan areas is inter-city transportation — that is, transportation of passengers, mail and express between the various outlying cities themselves. This phase of helicopter service will, we hope, be developed in the near future.

The third function of the helicopter is what we all know as commuter service — that is, the transportation of passengers from the suburban areas into the heart of the big city in the morning and back to their suburban homes at the end of the day.

Admittedly, passenger response to a helicopter commuter service is limited due to the high cost. Newer and larger helicopter equipment, which will help bring the necessary fares down, probably will not be available

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for developing this suburban-commuter market for several years.

In short, Los Angeles Airways — a scheduled helicopter airline — has already proven itself as the "new dimension in transportation" and has definitely proven itself as an indispensable part of our local metropolitan and the national transportation picture. ★ ★ ★

COMMERCIAL TRENDS

(Continued from page 35)

65.6 per cent of Bell's total — almost a complete reversal of the 1953 figure. Both an increased domestic demand and the availability of foreign-made Bell helicopters are responsible. Model 47G Bell helicopters are manufactured under license by Construzioni Aeronautiche Giovanni Agusta of Milan, Italy and Daiichi Bussan Kaisha, Ltd., of Tokyo, Japan.

In addition, Bell has seven foreign dealers and 43 foreign commercial sales representativees. Three salesmen cover the United States and Canada.

Most of the growth in the commercial helicopter business prior to 1954 had been with commercial charter operations. Private companies, government agencies, or individual other than commercial charter operations purchased 32 per cent of this year's production.

Many of these bought their own machines after having first seen the effective way in which helicopters could handle their particular needs through hire of a charter operator's Bell machine. This trend does not hurt the business of commercial operators. It is in the field of private corporate use that Bell expects most rapid growth in the years immediately ahead, thanks, in part, to the new Model 47H-1 executive craft which Bell placed on the market this year.

Such firms as New York Trap Rock, which has numerous facilities in New York and Connecticut, and Radio Materials Corp., which has two plants 130 miles apart in Chicago and Attica, Ind., have found that the helicopter saves money as a means of executive transport. Firms like Magnolia Petroleum, Colorado Interstate and Anaconda have integrated the Bell helicopter into field operations for both time and money savings.

Growth within the commercial helicopter market surprised even Bell optimists. In mid-1955, Bell officials were amazed to find their production for the entire year committed. Additional production was hastily added for the year.

Production planned for 1956 has been increased and, already, Bell has received firm orders for 50 per cent of the helicopters it had originally scheduled for the year. Still more will be added to manufacturing schedules for 1956 delivery.

Besides the standard utility Model 47G and its more powerful counterpart, the Bell Model 47G-2, the three-place, streamlined Model 47H-1 will again be offered for commercial sale. The four-place Bell Model 47J will be put on the market in 1956 and every indication points to this streamlined utility craft to answer a "long-felt need" in the commercial helicopter world. The prototype was shown on a demonstration tour last spring and response has indicated a big market.

While there are more Bell commercial helicopters in operation today than all other makes and models combined, military business still takes most of the company's helicopter production.

Currently, Bell is building the powerful tandem-rotor HSL anti-submarine helicopter for the Navy as well as Navy HTL-6's (Model 47-G's with boost control) and the Navy HUL-1 (military version of the Model 47J). For the Army Bell is building the H-13H (military counterpart of the commercial Model 47G-2) and the revolutionary turbine-powered XH-40 and XV-3 convertiplane, both of which hold unusual commercial promise.

I believe we are safe in assuming that the day of public acceptance of helicopters is here. Continued growth in the commercial helicopter business is a certainty. ★ ★ ★

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NEW FOR THE NAVY

(Continued from page 66)

of Hollywood. They did it after only 10 hops, compared to 19 flights previously required in the SNJ. Following further evaluations, the revised training syllabus was approved for implementation by higher headquarters, thus sealing the fate of the perennial SNJ — a reliable old workhorse but one that had outlived its usefulness in modern Navy training.

Navy sources report that the T-34 will permit an earlier determination of the individual student's ability to solo and less concern with the inherently difficult techniques peculiar to the SNJ. It will also provide for a higher continuity of procedures in basic and advanced training. Similar flight characteristics and cockpit configuration on the T-34, T-28 and T2V jet trainer should make transition from one phase to the next comparatively easy.

Modernization of aircraft type, attained with the advent of the tricycle landing gear, which is now becoming conventional, will increase flying safety in the initial stage of the training cycle. The Navy expects the minor accident rate, largely due to "swerve control" on take-offs and landings, to decline substantially with the T-34. For the Navy's new aviators, the day of the tail wheel and the dread of the ground loop are destined to become mere legend.

"In comparing the old with the new," a Navy report says, "the SNJ climbs at 500 feet per minute but the T-34 cloud hops at a pace of 1,100 feet every 60 seconds. The Jay's normal cruising speed is 120 while the sleek T-34 booms along at 135 knots. Compared to the SNJ's operating range, the T-34 ceiling is 19,500 feet and she can cover 740 nautical miles with a maximum cruising speed of 163 knots or almost twice the distance of the SNJ."

The T-34, now the standard primary trainer for both Air Force and Navy, was developed by Beechcraft after World War II as a private venture. A high-performance plane with safety factors far in excess of other trainers in its class, the T-34A has been in production for the Air Force since early in 1953. It also serves the allied forces of five foreign nations — Canada, Chile, Colombia, El Salvador, and Japan.

Seating student and instructor in tandem, the highly maneuverable Mentor has a gross weight of 2,900 pounds and has no acrobatic restrictions. But one of the most important benefits is the economy of operation, for the T-34 can be flown at a fraction of the cost of other military trainers in it category. Design simplicity also makes maintenance easy and contributes to greater utilization.

Aside from the tricycle landing gear, other prominent features of the T-34 are the constant speed propeller and the 225-hp. Continental, six-cylinder, air-cooled horizontally-opposed engine.

Naval air training today is open to young men in two classifications — aviation cadet and aviation officer candidate. To qualify as a naval aviation cadet, applicants must be between 18 and 25 years of age, single, have at least two years of college, meet the physical requirements, and be motivated to fly. In contrast to the Nav-Cad program, aviation officer candidates may be married, but must be college graduates, at least 19 years old and under 26, and meet the other qualifications.

The pilot training program, which is in three parts, begins at the Naval Air Station in Pensacola with about 16 weeks of pre-flight, including subjects such as flight theory, navigation, aerology, aviation communications, military leadership, and athletics.

After pre-flight, cadets and student officers enter eight months of basic flight training. The primary phase of basic takes 12 weeks. In the old program 22 hours of dual instruction in the SNJ were necessary before solo.

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With the T-34, the pre-solo stage has been trimmed to about 11 hours. And because students attain a high level of proficiency quicker in the T-34, formation flying — hitherto reserved until a later stage, is now introduced in primary. Under the new syllabus, pilot trainees start right off in the T-34B on which they get about 57 hours of instruction including pre-solo, precision, acrobatic, formation and instrument flying.

Incidentally, another significant development of recent weeks was the disclosure that the Navy is considering the relative merits of conducting primary training under military and civilian contract programs. Navy policy in the past has been opposed to the contract method, despite the fact that all USAF primary training is now being performed by civilian flight schools. As this is written, a private management firm is busy making a comparative analysis of the advantages and disadvantages of the two types of training for the Bureau of Aeronautics. The Navy is particularly interested in comparisons on costs, student flight proficiency, and which system turns out the best officers.

Upon completing primary, students progress from the T-34 to the heavier, faster T-28B, on which they receive about 100 hours of training in tactics, gunnery, instruments and carrier flying. Before students can pass basic, however, they must qualify in aircraft carrier landings, one of the most exciting — if not the most exacting — portions of pilot training. Carrier qualifications now consist of six landings in a T-28 aboard a CVL-type flattop based at Pensacola. This requires a total of 16 hours of instruction, including field carrier landing practice.

At the end of basic, students move on to one of the Navy's advanced flying schools for another four months of training, during which time they polish their pilot abilities and learn how to operate their aircraft as a weapon. Nautical eagles whose tastes are whetted more by jet juice than prop wash go to NAS Corpus Christi, Texas, where they receive additional instrument instruction in the T-28, then convert to the T2V jet. Students selected for single-engine training fly a total of about 110 hrs. in the advanced course. They check out in F9F, AD and S2F combat planes and receive specialized training in fighter, attack, or anti-submarine warfare missions. Advanced instrument flying in fleet type aircraft is stressed, as is weapons training consisting of fixed gunnery, bombing, rocket firing and strafing. Multi-engine students, on the other hand, proceed to NAS Hutchinson, Kansas, where they fly the "big planes." Big-plane pilots log about 180 hours in the advanced course, with emphasis placed on developing the student as a well qualified co-pilot for fleet operational duty. The student is introduced to multi-engine flying in the Beechcraft SNB, trainer version of the Beechcraft Model 18 executive transport, on which thousands of wartime aircrews were trained. From the SNB they advance to P4Y2 and P2V aircraft.

Upon completion of advanced training, both single- and multi-engine graduates are awarded their coveted Navy wings of gold and cadets are commissioned ensigns in the Naval Reserve or second lieutenants in the Marine Corps Reserve.

While the newly-graduated pilot must be capable of flying planes that yesterday would have been reserved for experienced airmen with vast technical knowledge, gradual innovations in the Navy flight program have actually simplified flight instruction. Green students are now learning the fundamentals of flying in up-to-date planes which are much easier to handle than former trainers.

The individual reaction of pilots

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Now there's no need to sweat out ILS approaches or fight to maintain OMNI tracks! ARC's new Course Director automatically directs the pilot to the correct headings required for effectively intercepting and making good a desired track. Heart of the system, the Compass Slaved Directional Gyro, gives constantly corrected directional information. System is accurate to one degree.

Computer portion of the system combines directional and track information obtained from the Localizer/OMNI Receiver and makes computations to provide the pilot with correct heading to intercept and/or make good a desired track, compensates for cross-wind. It relieves the pilot of 90% of his mental effort, prevents missed ILS approaches, saves time, effort and fuel, assures greater safety. Ask your dealer for complete information.

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and students who have flown the T-34 has been most enthusiastic, clearly indicating the overwhelming acceptance of this new trainer. They list among major advantages over its predecessor the plane's outstanding visibility, comfort, performance, and general flight characteristics. Fuel consumption is 50% less and maintenance reflects substantial economies. Briefly, the consensus of flight and maintenance personnel is that the Mentor represents a big step forward in naval air training.

The novelty of the T-34 to the basic program was probably best described by Lt. Walter R. Thomas when he said, "It's all three wheels in front." To old Navy prop pilots, a "wheel in front," like a female landing signal officer, is hard to imagine but pleasant to contemplate. ★ ★ ★

ADIZ REQUIREMENTS

(Continued from page 62)

tion without reporting change of altitude.

Exceptions: The provisions which follow are made to exempt certain flights from Security Rules. Pilots are urged to study these exceptions and to refer any questions to the nearest CAA communications station.

1. A flight which maintains a true airspeed of 110 KNOTS, or less, and an altitude of 1,500 feet, or less, above the immediate terrain.

2. A flight originating within the Eastern Defense Area and maintaining an outboard track into or thru the Eastern ADIZ, Northern ADIZ, Presque Isle ADIZ or Southern Border ADIZ without penetrating the Albuquerque ADIZ, Western ADIZ, or a Coastal ADIZ.

3. A flight originating within the Western Defense Area and maintaining an outbound track into or thru the Western ADIZ, Northern ADIZ or Southern Border ADIZ without penetrating the Albuquerque ADIZ, Eastern ADIZ or a Coastal ADIZ.

4. A flight originating within the Central Open Area and maintaining an outbound track into or thru the Northern ADIZ, or Southern Border ADIZ without penetrating the Eastern ADIZ, Western ADIZ or Albuquerque ADIZ.

5. A flight originating in the Albuquerque ADIZ proceeding outbound into the Central Open Area without penetrating the Eastern or Western ADIZ, providing the route of flight passes no closoer to Albuquerque or Los Alamos, N. M., than the point of departure.

6. A local flight within 10 miles of the point of departure.

7. An aircraft without two-way radio may enter or operate within an ADIZ, provided the pilot adheres to a filed DVFR flight plan which includes the route, altitude, point of penetration and estimated elapsed time to the point of penetration. Aircraft without two-way radio may operate entirely within an ADIZ, provided that the pilot adheres to a filed DVFR flight plan which includes the route and altitude within the ADIZ and he departs within five minutes of his estimated time of departure.

Recommended ADIZ Practices: The Security Rules do not prohibit pilots from filing their flight plans by radio. The Air Defense Command, however, advises that an "Airfiled" flight plan makes the aircraft subject to interception for positive identification. Pilots are strongly urged, therefore, to file DVFR flight plans required for Security Control either in person or by telephone. To encourage conformance with this request CAA communications stations will accept collect long distance telephone calls made for the purpose of filing required DVFR flight plans. The following procedure will apply:

1. Before placing the call, you should make out your DVFR flight plan and determine the telephone num-

As the year 1955 draws to a close and the holiday season approaches, we would like to take time out to say a word of thanks to our many friends and customers who have made our many years in business such a pleasure. We are deeply grateful for the opportunity of knowing and serving you and we look forward to many more years of our association.

To you, from all the folks at AIRCRAFT SALES COMPANY, we wish this to be your happiest Christmas ever and your weather CAVU as you take off into the NEW YEAR.

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ber of the nearest CAA communications station located in an ADIZ or an Open Area, either from the Flight Information Manual or other source.

2. Contact the long distance telephone operator and place a collect station-to-station call from "SECURITY PILOT (your last name)" to the CAA station.

3. When the CAA station accepts the call, file your DVFR flight plan as expeditiously as possible.

Pilots should note that CAA stations will not accept collect calls from locations which are obviously much closer to another CAA station, neither will they accept calls which do not contain the key words "SECURITY PILOT (name)." In order to conserve government funds, CAA stations will not accept long distance collect calls from any point within either the Eastern or Western Defense Area. DVFR flight plans from such points will be accepted however if filed at no expense to the government.

Emergency Situations: Where safety is involved, a pilot may deviate from ADIZ requirements as necessary to meet an emergency. He shall, however, report deviations and reasons for them as soon as practicable.

Under emergency defense conditions which may involve National Security, pilots shall follow any additional security instruction issued by the CAA for purposes of identification, location and control of individual flights.

Questions regarding local application of these regulations should be referred to the nearest CAA communications station. ★ ★ ★

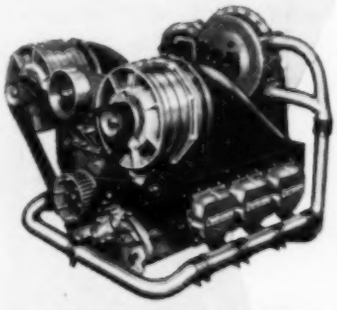
JUST AMONG OURSELVES

(Continued from page 18)

ly ridiculous Federal penalty of only 10 years and or $10,000 fine for conviction of such a crime must be replaced without delay.

No other alternative than a Federal death penalty law exists because the U. S. aviation agencies, the airlines themselves, the insurance companies and in many cases even state courts are completely powerless to cope with such situations or adopt any measures whatsoever to effectively eliminate the possibility of crackpots planting explosives in baggage or cargo. The lesson from the Denver catastrophe is clear and simple — a Federal law similar to the Lindbergh kidnapping law which brings into action full-scale Federal investigation and prosecution for the death penalty — anything less would be sheer nonsense. Why our industry did not push for such a law after a similar Canadian mass murder some years ago can never be explained away. ★ ★ ★

CONTINENTAL AIRCRAFT POWER



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On Sept. 13, 1955, a Cessna CH-1 helicopter settled to a landing on the summit of Pikes Peak, something no aircraft of any type had ever done before. Then, after taking a third passenger aboard, it successfully finished hovering tests begun earlier in the week, including a climb to an indicated altitude of 17,600 feet above Colorado Springs. At Camp Hale, it hovered with 50 gallons of fuel and four persons aboard—a phase of the test considered especially noteworthy, since it took place at a season when all flying operations in the area are normally suspended because of extreme turbulence at this high altitude . . . These latest tests add to the already fine performance record of the fastest certified helicopter in the United States. The characteristics demonstrated in the Colorado workout speak volumes for the power plant, too, and what they say has real meaning for all who own or fly utility planes. They underscore the wisdom, now more apparent than ever, of choosing a plane which gives you dependable Continental power.

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MUSKEGON, MICHIGAN

NEW TEMCO ARMAMENT TRAINER made its unannounced appearance last month at Temco Aircraft's 10th anniversary open house in Dallas. A new Model 58 version of the Temco Plebe trainer, it mounts a 340-hp. supercharged Lycoming engine, 3-bladed propeller and a variety of armament including machine guns, rockets and bombs. Domestic and foreign sales are sought for it.
(Temco Photo.)

Questions and Answers for Operators

Local Planning and General Aviation

QUESTION: A few months ago I was appointed a member of the aviation committee of our Chamber of Commerce. I waited three months for the chairman to call a meeting and finally I telephoned him and he told me he was busy and there had been nothing of any importance to discuss. So I drove out to the airport and walked into the terminal building. I was familiar with it since I was and am a fairly regular airline passenger, but I did not know the airport manager.

Back at the end of a long hall I found his office and introduced myself as a newly appointed member of the aviation committee of the chamber. He was polite and likeable and we sat and talked awhile. Yes, he knew several members of the committee. No, he hadn't attended any of its meetings for some time. Why? Because if there had been any he wasn't informed of them or invited.

Had the committee been active in the past and had it been of assistance in aviation development? It appeared that it had not been active and that its weight was not appreciable. Could it serve in a helpful matter if it became active and interested? He wouldn't like to answer, since it might be a reflection on past committees. We went into the coffee shop for a hot cup and he opened up a little more.

Boiled down it came to this: In the tight confines of the municipal organization he had been rebuffed again and again for his efforts to modernize the facilities at the airport, except with relation to one segment of aviation. As he expressed it, the city and the chamber thought all aviation consisted only of the airlines. What they wanted, they asked for and got substantially that. He didn't blame the airlines. He had no prejudice against them, but he felt there were other needs and they were not being fulfilled.

We drove around the apron in the rain. We counted twenty-three planes, tied out along the apron and on sod. We walked through the hangars and they were crowded. He showed me the conditions of the structures and the doors, the need of upkeep and paint. He pointed out the names of the companies and individuals painted on the sides of some of the planes. They were names that represented a good cross-section of the business life of our community. He told me what individual planes cost and when I totalled the investment in only a part of them I was amazed at the sum invested.

He told me of the bond issue the city officials were planning to take to the voters in the spring. I asked him what it was for. He told me — a terminal building modernization and what he called more positions for the terminal apron, a runway extension and taxi-strip.

No, there was nothing included for modernization of the hangars, their aprons or for any additional hangar space. At the moment an airline wanted a hangar and it would be a stiff fight to keep a hangar operator from being displaced.

We dropped into an office in one of the hangars and talked to a man he introduced as a fixed-base operator. He said he could sell a half dozen aircraft if there was some place they could be stored. He said overnight transient business at the airport was declining because there was no storage space. I asked him what he had done about the situation of making his needs known to the city. He just said,

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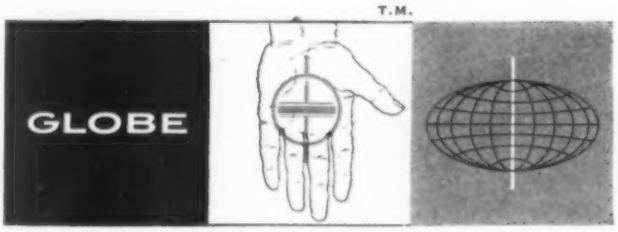

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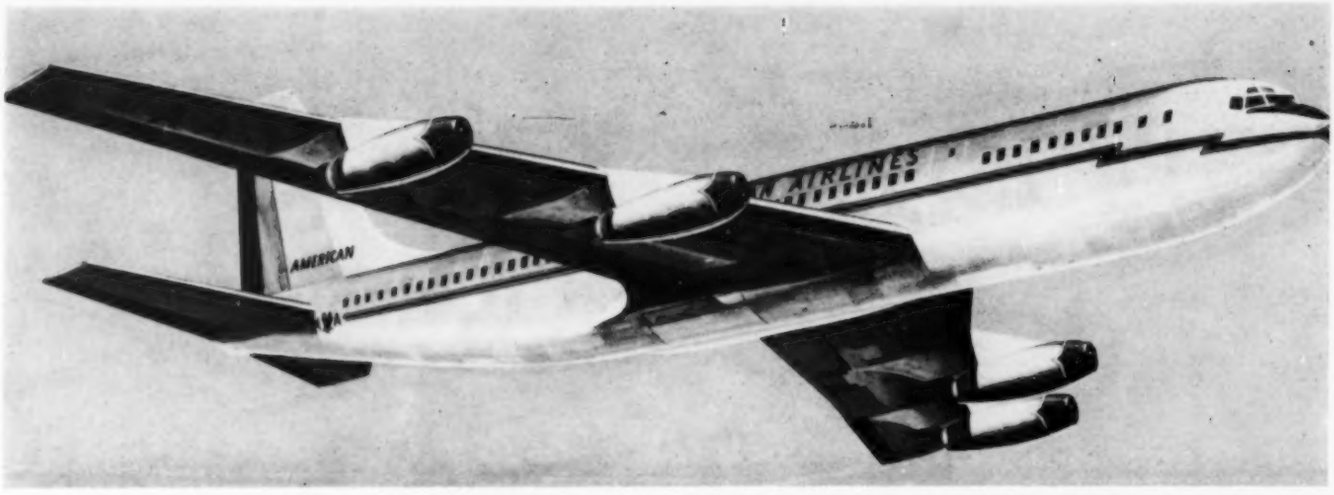

FIRST DAILY TRANSCONTINENTAL JET AIRLINE SERVICE will be flown by Boeing 707's operated by American Airlines. C. R. Smith, American Airlines chief, says he has scheduled the first jet passenger flights to begin on June 15, 1959, between Los Angeles and New York, with the eastbound trip scheduled only 4 hrs. 15 mins. American last month ordered 30 of the big Boeing jets at a cost of $135,000,000. —(American Airlines Drawing.)

"Them dudes!" Could the aviation committee be of any assistance in the matter? I got the same answer.

There is going to be a meeting of the aviation committee of the chamber, because I sat down with the chairman and insisted. I don't know what success I'll have and you can't help me in this first meeting because it will be over before your next issue comes out, but I'd like to have you give me some idea what such a committee should do and what it should concern itself with.

ANSWER: Don't take the situation in your town as typical of all such committees although we have seen some like yours before. Likewise we have seen such committees with great strength and purpose accomplish substantial gains for aviation at the local level. Unfortunately there is a tendency in many larger cities and towns to overlook what is generally referred to as "general aviation." Aviation people have for many years ascribed the failures of the general aviation segment to secure needed facilities and deserved consideration to the fact the users and owners have not made themselves heard. Exponents of that steadily expanding element in air transportation have held to that theory. That alone, however, is not the reason for some of the conditions which limit the use of executive and corporate aircraft. Airline operations are growing, too, and their needs require expansion of facilities. Those needs are more readily evident to officials and gain a quicker response.

No one connected with general aviation would or does object to the investment of public funds in facilities needed for adequate accommodations for the carriers. All the small business that is known as general aviation needs to be remembered, too. When measured in dollars and cents their individual volume is small compared to the carriers and their needs are not as readily evident. In short, when improvements are planned and funds provided, all the elements that make up air transportation should be considered in the light of their respective needs. For the most part the small business in aviation as well as the large can pay its way on an airport.

When municipalities are shortsighted in that respect, there is no local body more fitted to interpret the needs of all the segments of civil aviation than an able and interested group such as the aviation committee of your Chamber of Commerce. It may reasonably inquire into the purpose for bond issues and other major expenditures to the end that planning is over-all rather than confined to only one part of the civil aviation needs. It may do this on a wholly impartial basis on the premise that industry, agriculture and commerce are served by the fixed-base operator as well as the airlines. Such a state-

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ment does not envisage any reduction in expenditures for airline needs below their requirements, but does urge that the general aviation needs be considered and met, too.

Two areas of danger arise in planning for heavy expenditures. The first lies in planning the use of all the funds procurable for the big businesses of aviation to the exclusion of the necessary small business that serves the needs of general aviation, especially local and transient business and executive operations. The second lies in the ill-advised removal of general aviation operators from hangars and other structures in favor of big businesses with larger payrolls, a constant temptation. Your aviation committee, working from outside the confined circles of official municipal organizations, can and does in a measure represent the whole community. Each operator speaks usually only for himself and bears only the weight of that one individual or entity when any conflict of interest arises. A well organized aviation committee dealing impartially with the whole problem can make its voice heard through the sometimes thick walls of official indifference.

To do that, your committee needs to study and know all the needs of all the people who use your airport and to evaluate them to the degree necessary to enable that committee to form a sound program of over-all improvement and to urge with a strong voice that it be followed for the benefit of all. It should not be heavily weighted either to big business or the little fellow.

Its impartiality should be evident in its findings. Frankly, to do that it will be necessary for the individual members of your committee to seek and accept a general education in what is going on in aviation today — to secure an accurate concept of the commerce that is moving in corporate and executive aircraft. It will necessarily include consideration not only of the physical elements involved but also in the financial aspects of the various service elements.

You've a big job ahead of you. All general aviation asks is that you don't forget the little fellow.

Hotel for Idlewild

With completion scheduled for June, 1957, a 250-room hotel costing $2,500,000 is being constructed by the N. Y. Port Authority on a 10-acre site at Idlewild Airport north of the Federal building near the southwest corner of the Van Wyck Expressway and Southern Parkway intersection.

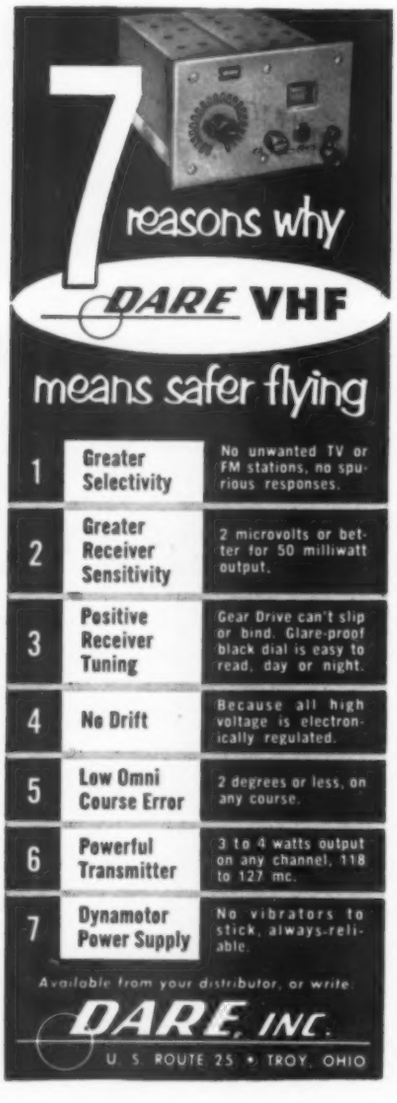
It will be operated by the Knott Hotels Corp., under a 25-year lease at an estimated annual rental of $285,000. The hotel will include a restaurant, coffee shop, bar and cocktail lounge.

Sky Harbor Airport

Interesting facts about Sky Harbor Airport at Phoenix, Arizona, have been made available by the Phoenix Chamber of Commerce. Sky Harbor now covers 1,003 acres, has over 50 hangars, an $856,500 terminal, 18 aeronautical firms, a private plane terminal and three runways with taxi strips.

Directly behind the terminal are parking places for 375 cars, a super service station and 88-car parking garage, the plush Sky Riders Hotel and an air-conditioned $65,000 transient terminal and parking ramp for private planes. The airport hotel, first of its kind in the nation, is a completely air-conditioned, sound-proofed hotel with swimming pool and other conveniences. A $250,000 construction program is now under way to add 34 rooms to the present 45 two-room suites. In addition, coffee shop, bar and other facilities will be added.

Sky Harbor is now the home base for 336 private and business airplanes. The 1954 total of tower-controlled flight movements was 191,000, with 21,897 flights for March of 1955 as an all-time record. More than half were private plane movements and during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LUND SUPPLIES S-55 ENGINES, TOO!

The Sikorsky S-55 helicopter is one of several new production aircraft powered by Lund-supplied engines.

These P & W R-1340's were overhauled by the reputable Airwork Corporation—then re-inspected before delivery by Lund specialists to insure that all pre-installation modifications were complete.

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the first half of 1955 the field's operators serviced 12,180 private planes.

Most of the aviation firms are located to the north of the main terminal. Largest manufacturers are AiResearch and the Babb Company, specializing in aviation research, jet overhauls and component manufacturing. Eight other firms, acting as aircraft sales and service operators, are located nearby. There are two crop dusting firms, an air photo lab and four flying schools. One of these is that of the Phoenix Union High Schools and Phoenix College District with about 8 planes, 5 instructors and 300 students.

The airport is a division of the Public Works Department under the direction of the public works director, who is responsible to the city manager. Superintendent of airports is William J. Ralston. His staff includes Art Bethancourt as operations officer and Mel Harrison as maintenance superintendent.

More About Chasing Birds

We have received another letter of information answering our inquiry several months ago regarding the use of electrical vibrators or sound generators in eliminating birds from hangars. This one's from Robert J. De Crocker, manager of the Kalamazoo Municipal Airport, Kalamazoo, Michigan. He writes as follows:

"This may be a possible answer to

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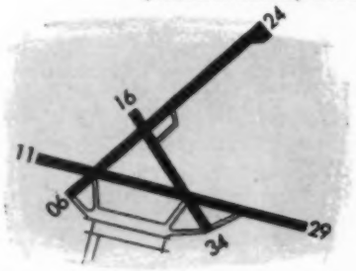

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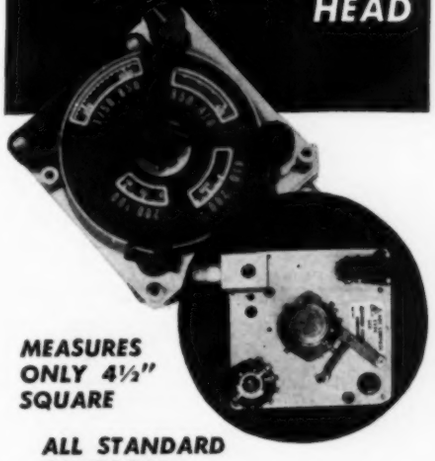

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